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School of Business

The association between brand strength and the riskiness of a company

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Research findings from Finland

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ABSTRACT

RESEARCH OBJECTIVES:

The purpose of this thesis is to study whether brand strength affects the riskiness of a company. This association is examined from both market risk and business risk aspect. In addition to this, it is studied, if this association is dependent on whether the firm operates in consumer business or business-to-business market. The study contributes to existing literature as there is not much prior research done related to the topic, and as it the first one done using Finnish data.

DATA AND METHODOLOGY:

Brand Finance published 100 top Finnish brands in 2008. The brand strength data is obtained from their publications. The financial statement information needed to conduct the statistical analysis is obtained from Thomson One Banker database. The research question will be measured by conducting a statistical analysis using SPSS. The research methods include descriptive statistics, correlation analysis and multiple linear regression analysis.

RESULTS:

The multiple linear regression analysis was conducted separately for both market risk and business risk, and the test and control variables were added into the analysis in three blocks. No statistically significant association between brand strength and the riskiness of a company was found, nor gave the results any support on the assumption that this association is dependent on whether the firm operates in consumer business or business-to-business market.

Keywords Market risk, systematic risk, business risk, brand strength, brand equity

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TIIVISTELMÄ

TUTKIMUKSEN TARKOITUS:

Tutkimuksen päätarkoitus on selvittää vaikuttaako brändin markkinavahvuus yrityksen riskisyyteen. Tätä tutkitaan sekä systemaattisen, eli markkinariskin, että yrityksen liikeriskin näkökulmasta. Lisäksi pyritään selvittämään onko tämä yhteys riippuvainen siitä, onko yrityksen liiketoiminta suunnattu kuluttajille vai yritysasiakkaille. Tutkimuksella on selvä kontribuutio olemassaolevalle tieteelle, sillä aiheeseen liittyviä aikaisempia tutkimuksia on hyvin vähän, minkä lisäksi tämä on ensimmäinen suomalaisella aineistolla toteutettu tutkimus aiheesta.

AINEISTO JA TUTKIMUSMENETELMÄ:

Brand Finance julkaisi tulokset 100 Suomen arvokkaimmasta brändistä 2008. Brändin markkinavahvuutta kuvaava aineisto on kerätty heidän julkaisustaan. Tilastollisen analyysin toteuttamiseen tarvittavat tilinpäätöstiedot on kerätty Thomson One Banker -tietokannasta. Tutkimus toteutetaan tilastollisena analyysinä käyttäen SPSS-ohjelmistoa. Käytetyt tutkimusmetodit ovat kuvailevat tilastot, korrelaatioanalyysi sekä lineaarinen regressioanalyysi.

TULOKSET:

Regressioanalyysi toteutettiin erikseen markkinariskille ja liikeriskille. Tulokset olivat yhdenmukaisia siinä, ettei brändin markkinavahvuuden ja yrityksen riskisyyden välillä löytynyt tilastollisesti merkitsevää yhteyttä. Lisäksi tulokset osoittivat, ettei tämä yhteys ole riippuvainen siitä, onko yrityksen liiketoiminta suunnattu kuluttajille vai yritysasiakkaille.

Avainsanat Systemaattinen riski, markkinariski, liikeriski, brändin markkinavahvuus

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1. INTRODUCTION

1.1 Background to the Topic

Since the late 1980s, brand equity has been one of the most important marketing concepts in both academia and practice (Srinivasan et al., 2005). Brand equity is regarded as a very important concept not only in business practice but also in academic research, because marketers can gain competitive advantage through successful brands (Lassar et al., 1995). According to Lassar et al. (1995), the competitive advantage of firms that have high brand equity includes the opportunity for successful extensions, resilience against competitors' promotional pressures, and creation of barriers to competitive entry.

According to Keller (1993), there are two general motivations why much attention has been devoted to the concept of brand equity. The one is a financially based motivation to estimate the value of a brand more precisely for accounting purposes, or for merger, acquisition, or divestiture purposes. The other arises from a strategy-based motivation to improve marketing productivity.

This study aims to study the association between brand strength and the riskiness of a company, from the perspectives of market risk and business risk. McAlister et al. (2007) noted that although there are much studies done related to the relationship between a firm's accounting characteristics (e.g. dividend payout, growth, leverage, liquidity, asset size, earnings variability) and its systematic risk, much less is known about the relationship between the important indicators of marketing strategy and systematic risk. According to Bharadwaj et al. (2010), even though existing literature examines the impact brand quality has on stock returns it is relatively silent about its impact on the systematic and idiosyncratic risk of stock returns. They state that shareholder wealth consists of three components: stock returns, systematic risk, and idiosyncratic risk. In their study, they found that changes in brand quality enhance shareholder wealth by being positively related to stock returns and negatively associated with changes in idiosyncratic risk. Bharadwaj et al. (2010) note, however, that unanticipated changes in brand quality are positively related to systematic risk, which implies that they may also erode shareholder wealth.

Generating a healthy return on invested capital and making wise investments are two main drivers of shareholder value. According to Kerin and Sethuraman (1998), the conceptual foundations for a relationship between brand equity and shareholder value reside in a variety of literature, including financial economics, financial accounting, and marketing. Although brand-related research has been notably marketing-driven, this relationship forms a clear link also to accounting, since, as Kerin and Sethuraman (1998) point out; cash flow has a central role in determining the financial market value of a firm and ultimately shareholder value. If intangible assets (including brands or brand-related factors) increase firm's earnings and cash flows, companies can be viewed as being worth more with these assets than without them (Kerin and Sethuraman, 1998). Lev (2004) states that: "intangible assets generate most of corporate growth and shareholder value". According to him, intangible assets give today's companies their hard competitive edge. Bharadwaj et al. (2010) note, however, that while an asset might increase stock returns, and this way shareholder value, it might also increase the risk of stock returns, which is why the risk aspect should be studied from this viewpoint to a greater extent.

Dutordoir et al. (2010) point out that firms are increasingly aware that their brands are among their most important intangible assets. Also Keller & Lehmann (2006) reported that "branding has emerged as a top management priority during the last decade due to the growing realization that brands are one of the most valuable intangible assets that firms have". In a report conducted by BBDO (2001), a worldwide advertising agency, it was noted that brands are growing ever more valuable. In addition, brands were referred to as being the key determinant of enterprise value and stock market capitalization in this age of cross-border mergers and acquisitions.

However, Madden et al. (2006) claim that to address whether shareholder value is created (or possibly destroyed) it should be recognized that shareholder value is both a relative and risk-adjusted concept. Added to this, according to Bharadwaj et al. (2010), both components of shareholder wealth, stock returns and risk, should be examined, since while an asset might increase stock returns it could also increase the risk of stock returns.

The topic of this thesis is also important in practice. Firms and investors will benefit from learning if there is a link between brand strength and the riskiness of a company. Added to

this, the topic is extremely important at the moment when the economic situation is as uncertain as it is. Companies need to find new ways to retain customers, to make bigger profits, to continue to offer jobs for their employees, and to yield value to their stakeholders. This study not only further explores an important topic that has not yet been thoroughly studied but is also the first study done with Finnish data.

1.2 Objectives

This study will contribute to the existing literature by further studying the association between brand strength and risk. In addition, it will be examined whether this association is dependent on whether the firm operates in consumer business or business-to-business market. This is the first study conducted using Finnish data. Two empirical measures for risk are identified in this research: market risk (measured by beta) and business risk (measured by variance of ROA).

The main hypothesis is that companies with strong brands have lower levels of market and business risk, and it will also be reported, whether firm's main industry (consumer business versus business-to-business) has an effect on the association between brand strength and firm's riskiness. One could expect that companies with strong brands mean less risky investments with more secured stock returns and less volatile profitability. On the contrary to this, a few researches have reported that brand building is highly important to business-to-business sector firms as well (see e.g. Mudambi, 2001; and Gordon et al., 1993).

Most of the articles studied and reported later in the paper, in the literature review, seem to strengthen the view that having a strong brand has mostly positive outcomes for a company (see e.g. Bharadwaj et al. 2010; Dutordoir et al. 2010; Kerin and Sethuraman 1998; and Srivastava et al. 1998). However, interestingly Bharadwaj et al. (2010) also found that companies with higher brand quality were hurt more during the recent recession. Not much prior research is related to the topic of this study, which is why it is an intriguing subject. It is also intriguing due to its topicality and due to the practical usefulness and importance of the results.

1.3 Data and Methodology

The statistical analysis of this research explores the relationship between brand strength and the riskiness of a company. Two risk measures, beta for market risk and the variance of return on assets (ROA) for business risk will be used as the dependent variables. Brand strength is the main test variable while firm's main industry (consumer business versus business-to-business), total assets, price-to-book ratio, financial leverage, operating leverage and personnel costs per fixed assets were chosen as the control variables in the regression equation, based on prior literature.

The research question will be measured by conducting a statistical analysis, which will be implemented using SPSS. The methods used include descriptive analysis, correlation analysis and multiple linear regression analysis. Brand strength data was available for only 2007 and for this reason the data for other control variables was also retrieved from the same fiscal year. In order to find causality, betas (for market risk) were obtained from monthly data from 2008 and variance of ROA (for business risk) was calculated from company-specific return on asset values for a period of 2002 until 2011.

Data for brand strength is obtained from calculation done by British Brand Finance in cooperation with Finnish BrandWorxx, and the financial data for calculating the other variables will be obtained from Thomson One Banker database. The research will be conducted using data for Finnish listed companies.

1.4 Results

The regression analysis was conducted separately for both risk measures and the independent variables were added in the analysis in three blocks. For market risk, the results showed, after adding all the variables into the model, that there is no statistically significant association between brand strength and risk. In addition, it seemed that the association between brand strength and risk is not dependent on whether the firm operates in consumer business or business-to-business market. Thus, no support for any of the presented hypotheses was found.

For business risk, the results were similar. Based on the results, there is no statistically significant association between brand strength and business risk, nor is this association dependent on whether the firm is operating in consumer business or business-to-business market. Two robustness tests were also conducted, by measuring business risk with a trend cleaned return on assets and with the variance of change in return on assets, but the results remained fairly similar.

Based on prior literature and the results from related researches, it could have been assumed that the regression analysis results in this study would have been at least somewhat more significant. However, it should be noted is that these results do not prove that there could be no association between brand strength and the riskiness of a company whatsoever. Nor do these results prove that this association could be dependent on whether the company operates in consumer business or business-to-business market. The results only show that with this sample and with these variables there is no statistically reliable evidence on such assumptions.

1.5 Structure

After an introductory chapter the rest of the research is organized as follows. First, the key concepts that appear in this study will be determined in chapter 2. Second, prior literature is discussed in chapter 3 in detail from the perspectives of brand strength, market risk and business risk. In chapter 4, the hypotheses are presented. Chapter 5 will focus on describing the data and the study period used in this research. After that, the research methodology is presented in chapter 6 and the empirical results are reported in chapter 7. Finally, chapter 8 concludes this study, points out the possible shortcomings and gives implications for further research.

2. DEFINITION OF KEY CONCEPTS

There is a huge amount of various concepts related to brand. My focus will be on the association between brand strength and risk. In the relevant literature, brand equity is a more commonly used term than brand strength. The reason why I, however, choose to use brand strength in my thesis is that I find it more descriptive and easier to understand.

In this chapter, I will first determine the concepts of both market risk and business risk. Then, I will shortly define brand, after which brand strength is defined and thoroughly viewed from different perspectives that dominate the relevant literature.

2.1 Risk

Market risk

Risk is the main concept of this research. McAlister et al. (2007) have determined the concept of risk by paraphrasing portfolio theory. They stated that in equilibrium, the risk that is priced in the stock market is the stock's systematic risk. According to them, systematic risk is a function of the extent to which the stock's return changes when the overall market changes, that is, the market-driven variation in a firm's stock returns, which cannot be diversified away. Unsystematic risk, then again, is unique to a particular company and independent of factors that affect all securities in a systematic manner (Bettis, 1983). This component of total risk can be reduced or even eliminated with a properly diversified portfolio.

The key idea of portfolio theory is that investors can construct a portfolio of stocks with imperfectly correlated returns and thus eliminate unsystematic risk associated with those stocks. The remaining variability, the firm's systematic risk, reflects the extent to which its stock's return responds to the movement of the average return on all stocks in the market. (McAlister et al., 2007) Bharadwaj et al. (2010) determine systematic risk as being the degree to which stock returns co-vary with the stock market returns. They state that firms that cushion themselves from the impact of stock market movements and deliver consistent cash flows enjoy lower systematic risk.

When all risk is firm-specific, diversification can reduce risk to arbitrarily low levels. However, when common sources of risk affect all firms, even extensive diversification cannot eliminate risk. The risk that remains even after extensive diversification is called market risk. This is the risk that is attributable to market-wide risk sources. Such risk is also called systematic risk, or non-diversifiable risk. The risk that can be eliminated by diversification, on the other hand, is called unique risk, firm-specific risk, nonsystematic risk, or diversifiable risk. (Bodie et al., 2008)

The greatest part of the total risk of security usually consists of unsystematic risk. Bettis (1983) noted that, typically, the amount of unsystematic risk of the total risk of particular security runs between 50 to 80 percent. Based on previous studies they state that 15 to 20 randomly selected stocks are sufficient to eliminate most of the portfolio's unsystematic risk. The possibility of diversifying away the risk causes investors not being interested in unsystematic risk and it will not be reflected in their valuation of the firm.

Business risk

While the total from shareholders' viewpoint consisted of systematic and unsystematic risk, from the firm's viewpoint the total risk consists of business risk (variability of operating income) and financial risk (variability of net income). There was much more literature and theory related to market risk available than there was related to business risk, but despite the lack of sources, this section should provide an understandable definition of business risk.

According to Wild et al. (2003), business risk is the uncertainty regarding a firm's ability to earn satisfactory return on its investments in light of cost and revenue factors. They note that while business risk is not primarily a result of management's discretionary actions, it can be lowered by skillful management strategies.

Kinnunen et al. (2006) note that in business the realization of a risk means losses, a firm's inability to meet its commitments, and in the worst case bankruptcy. According to them, the risks can be categorized and analyzed in different ways based on financial statement information. They state that from a firm's point of view risk can be divided into business

risk, which is the uncertainty related to a firm's operating income, and financial risk, which is the uncertainty related to a firm's net income.

According to Kinnunen et al. (2006), the uncertainty related to these two income statement items is directly proportional to their prior volatility; the bigger the volatility in the past, the bigger the uncertainty related to the operating and net income in the following years. Due this, the amount of both business and financial risk could be estimated based on the historical volatility of operating and net income. To control for the differences in firms' growth and size both items should be scaled using factors that describe size, such as total assets for operating income. This calculation gives return on assets (ROA), which is used as the measure of business risk in this thesis, and which, according to Kinnunen et al. (2006) is the direct indicator of business risk. The volatility is then measured by taking a variance of this ratio.

Leppiniemi (1993) determined that business risk is related to firm's real process. This is similar to how Kinnunen et al. (2006) defined business risk. Leppiniemi (1993) divides business risk further into external and internal business risk. The external business risk, according to him, derives from markets, the environment where the firm is operating, and from the unexpected changes happening in these two. The internal business risk, on the other hand, is related to the firm itself: how efficiently it uses its assets, how well it adjusts to economic cycles and changes in the environments, and how capable its management is (Leppiniemi, 1993).

The components of both risk measures will be discussed later in the literature review. However, one should notice that there is no all-encompassing list of variables affecting neither market risk nor business risk. This thesis tries to take into account the most relevant variables and add brand strength as a new explaining variable, whose effect on risk has not yet been extensively studied.

2.2 Brand

According to Dutordoir et al. (2010), a brand is commonly defined as a distinctive name for which the consumer has higher willingness to pay than for otherwise similar products. This is similar to how Barth et al. (1998) described brand already over ten years before Dutordoir et al. Barth et al. (1998) also added that brand brings about higher purchase frequency than otherwise. They claimed that the net effect of the benefits of a brand name is that a branded product potentially provides a firm with a higher level of operating earnings over time than does an unbranded product.

As Keller (1993) puts it, a brand is defined as a name, term, sign, symbol, or design, or combination of them, which is intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competitors. According to Erdem and Swait (1998), a brand becomes a market signal because it embodies a firm's past and present marketing strategies. In BBDO's (2001) report it is defined that a brand is a consistent, holistic pledge made by a company, or from the other point of view the face a company presents to the world. It is also stated that a brand serves as an unmistakable symbol for products and services helping a company to set itself apart from competing companies (BBDO, 2001).

2.3 Brand Strength

Defining brand strength is not as straightforward as one might think. Brand strength is probably most commonly seen as relating to marketing, but it does have a financial dimension as well. As Mills (2005) notes, one source of friction between different disciplines in business is that each discipline uses the same word to mean different things. According to him, this is also the case in terms of the use of term brand equity. Marketing professionals use the term to describe the strength of the brand with its customers, whereas financial professional more typically use it to characterise the brand as an economic asset. However, as Mills (2005) points out, these perspectives should be compatible: "a brand cannot realistically deliver premium margins unless its customers hold it in high regard and strong brand health must relate to the ability to drive growth through customer preference".

As Yoo and Donthu (2001) put it: “despite the considerable amount of interest, research that identifies and attempts to understand brand equity phenomena has been hampered because there has been no agreement regarding what brand equity is”. I have noticed that in many cases brand value and brand equity are used as synonyms (see e.g. Kerin and Sethuraman, 1998). This can also be seen in Kamakura and Russell’s (1993) study. They defined brand value (or brand equity) as being the outcome of long-term investments designed to build a sustainable, differential advantage relative to competitors. They also noted that brand value can be viewed as the value of the brand to the firm, or as the value of the brand to consumers.

Without a doubt, these concepts are closely linked to each other, and it really seems to be more of a subjective decision about what kind of distinction is made between brand value and brand equity and from which aspect these concepts are viewed, which then of course also affects how they are defined. In my research, brand strength refers particularly to the value of the brand to consumers, i.e. how strong and valuable consumers find a brand.

There are also other closely related or synonymous concepts to brand strength, in addition to brand value. Accorrding to Bharadwaj et al. (2010), the perceived brand quality represents consumers’ view of how well a brand meets their requirements and expectations. They state that brand quality is an important but distinct dimension of brand esteem, with leadership, regard, and reliability being others. They find that brand quality is conceptually distinct from consumer-based brand equity, which according to them includes other dimensions, namely, awareness, purchase intentions, and distinctiveness.

In many cases, consumer based brand equity, or customer based brand equity seems to depict the same thing as brand strength. Even though Bharadwaj et al. (2010) particularly mentioned that they make a distinction between brand quality and consumer based brand equity, I still make the assumption that what they see as brand quality is, at least partially, the same thing what I will call brand strength in my study. According to Bharadwaj et al. (2010), more research is needed to examine the impact of brand quality both on stock returns and risk, and I will use their study as piece of source material while conducting my research on the association between brand strength and the riskiness of a company.

Keller (1993) states that a brand has positive (negative) customer based brand equity when consumers react more (less) favorably to an element when it attributes to a fictitiously named or unnamed version of the product or service. The differential effect is, according to Keller (1993), determined by comparing consumer response to the marketing of a brand with the response to the same marketing of a fictitiously named or unnamed version of the product or service.

Erdem & Swait (1998) use brand value to refer to customer based brand equity. This again proves not only the variety of brand related concepts used by researchers but also that it is not always clear what is meant by these terms. According to my understanding, in most cases customer based brand equity is equivalent to brand strength.

What is more, there are numerous ways of explaining brand equity as such. Srinivasan et al. (2005) define brand equity as the incremental contribution ($) per year obtained by the brand in comparison to the underlying product or service with no brand-building efforts. Erdem and Swait (1998) expressed this in a more general sense. According to them, brand equity is the added value a brand gives a product. Torres and Tribó (2011), in turn, define brand equity as the marketing effects or outcomes that accrue to a product with its brand name, compared with those that would accrue if the same product did not have that brand name.

As Lassar et al. (1995) put it; brand strength constitutes the brand associations held by customers. They also say that brand equity can be phrased as “the enchantment in the perceived utility and desirability a brand name confers on a product”. They resulted in this kind of definition through five considerations they believe are important to brand equity. First, according to Lassar et al. (1995), brand equity refers to consumer perceptions rather than any objective indicators. Second, they state that brand equity refers to global value associated with a brand. Third, it is noted that the global value associated with the brand stems from the brand name and not only from the physical aspects of the brand. Fourth, brand equity is relative to competition, not absolute, and finally, brand equity has a positive influence on financial performance (Lassar et al., 1993).

Srinivasan et al. (2005) state that the incremental contribution obtained by the brand is driven by the individual customer's incremental choice for the brand, in comparison to his choice probability for the underlying product with no brand-building efforts. This is pretty similar to what Lassar et al. (1995) found already ten years earlier. According to them, brand equity stems from the greater confidence that consumers place in a brand than they do in its competitors, and it in turn translates into consumers' loyalty and their willingness to pay a premium price for the brand.

In my research, brand equity is perceived as a brand's strength in the market, i.e. how customers value the brand. I do not refer to the monetary value of the brand nor to the monetary value that brand might help to generate for the company. This is also the reason why I will refer to it as brand strength, to avoid possible confusion.

This chapter concentrated on defining the key concepts of this thesis as thoroughly as possible. The literature review in the next chapter will discuss the theory in more detail, take a glance at the previous research done relating to the topic, and also form a link between risk and brand strength as a basis for the empirical part of the study.

3. LITERATURE REVIEW

The main concepts, risk (both market risk and business risk) and brand strength, were defined in the last chapter. This chapter reviews previous literature related to the topic. First, the components of brand strength will be discussed. Second, a closer look at the association between brand strength and shareholder value is taken, which is then followed by a discussion on the sources of both market and business risk. Finally, the last section of the literature review discusses the main interest of this thesis, the association between brand strength and risk.

3.1 Components of Brand Strength

The first part of the literature review further explains the concept of brand strength by exploring the components which form it. In the empirical part of the thesis, a division is made between business-to-business and consumer business viewpoints of brand strength and the same division is made here.

3.1.1 Consumer Business Viewpoint

Srinivasan et al. (2005) conceptualize brand equity[1] as arising from three sources: brand awareness, attribute perception biases, and non-attribute preference. According to Srinivasan et al. (2005), brand awareness can play a dominant role in the brand choice if the customer has a strong awareness of some brands but not of other brands. This is because brands with a little awareness are unlikely to be purchased. Srinivasan et al. (2005) also suggest that brand awareness triggers customers to form perceptions (brand associations or images) toward the brand.

Keller (1993) describes brand awareness as being related to consumers' ability to identify the brand under different conditions. He states that brand awareness consists of brand recognition, which relates to consumers' ability to confirm prior exposure to the brand when given the brand as a cue, and brand recall performance. According to him, brand

[1] What Srinivasan et al. (2005) call brand equity is considered as brand strength in this study.

recall, in turn, relates to consumers' ability to retrieve the brand when given e.g. the product category as a cue (Keller, 1993).

Keller (1993) points out that brand awareness plays an important role in consumer decision making, first of all, because it is important that consumers think of the brand when they think about the product category. Secondly, according to Keller (1993), brand awareness can affect decisions about brands in the consideration set, and finally, it affects consumer decision making by influencing the formation and strength of brand associations in the brand image.

When it comes to brand associations, Srinivasan et al. (2005) found that strong, favourable, and unique brand associations may enhance brand preference. They draw from previous studies that brand associations (perceptions) contribute to brand equity by creating an attribute-based component of brand equity, which is created by brand associations related to product attributes resulting in favourably biased attribute perceptions. On the other hand, the non-attribute based component of brand equity is created by brand associations unrelated to product attributes, such as user imagery or brand personality.

Keller (1993) classifies brand associations into three categories: attributes, benefits, and attitudes. He defines attributes as those descriptive features that characterize a product or service. Benefits are, according to Keller (1993), the personal value consumers attach to the product or service attributes. Finally, he defines attitudes as consumers' overall evaluations of a brand. Keller (1993) highlights that brand attitudes are important because they often form the basis for consumer behavior.

Other researchers have determined the components of brand strength somewhat similarly. Lane and Jacobson (1995), for example, identified brand equity[2] to consist of two key components: brand attitude and brand name familiarity. According to them, since consumer behavior in any product market is dependent on the consumer perceptions of the brand (i.e. their familiarity with the brand and their attitude toward the brand), brand equity

[2] Lane and Jacobson (1995) use term brand equity in their research, but in this study it is considered to mean brand strength.

components should influence investor expectations of future cash flows and therefore stock price.

It can be interpreted that what Lane and Jacobsen (1995) called brand name familiarity is actually what Keller (1993) and Srinivasan et al. (2005) referred to as brand awareness. Lane and Jacobsen (1995) note that brand name familiarity, or brand awareness, has direct effects on the product choice. Based on previous researchers they point out that without specific product knowledge consumers may use brand familiarity as guidance for choosing between different products.

For comparison, Yoo and Donthu (2001) perceive brand equity[3] as consisting of four dimensions: brand loyalty, brand awareness, the perceived quality of the brand, and brand associations, as proposed by Aaker (1991) and Keller (1993). Aaker's book is one of the fundamental works for the whole brand equity research. By brand loyalty, Yoo and Donthu (2991) refer to consumers' tendency to be loyal to a certain brand, which occurs as the intention to buy the brand as a primary choice. According to Aaker (1991), brand awareness is buyer's ability to recognize that a brand is a member of a certain product category. He further sees perceived quality as "the consumer's judgment about a product's overall excellent or superiority", i.e. being based on consumer's subjective evaluations. Brand associations Aaker (1991) defined as "anything linked in memory to brand". According to him, a customer's link to a brand will be stronger when based on many experiences or exposures than when based on only a few.

3.1.2 Business-to-Business Viewpoint

As already brought up in this study, brand strength is a source of competitive advantage to a firm, since it enables brand differentiation and high levels of brand recognition, even among non-users. The previous section concentrated on the components of brand strength that typically affect individual consumers. The focus of this section will be on the discussion of how important brand strength is to organizational consumers.

[3] How Yoo and Donthu (2001) define brand equity equals the definition that is used of brand strength in this study.

In consumer markets, the importance of branding is rather self-evident but, as Mudambi (2002) notes, the nature and importance of branding in business markets is unclear and has not been researched extensively enough. One might assume that brand strength is of interest for consumer business companies more so than for companies operating in a business-to-business market. However, Gordon et al. (1993) recognize that also manufacturing firms can use brand equity[4] to build stable long-term demand, add value to a product, build and maintain profit margins, provide a base for expansion into new products and market, and protect the company against increasing competition. Also Mudambi (2002) discovered that in the ever more globalized world managers of business-to-business market firms are becoming more and more interested in finding out if branding could help in improving the firm's competitive position. Like Gordon et al. (1993), she also noted that business-to-business branding can be beneficial in terms of sustainable differentiation and increased customer loyalty.

Gordon et al. (1993) listed the most significant differences of the meaning of brand strength between consumer business and business-to-business sector. First, unlike in consumer products, most business-to-business products are branded with firm names. From this derives that the company name, not the individual brand, becomes the main discriminator. Also Mudambi (2002) found that the company brand is the focus of the branding strategy for most business-to-business firms. Second, positioning new products to differ from the existing ones may be difficult, due to the firm versus brand loyalty. Third, in the business-to-business market, loyalty comprises not only the firm and its products, but also the channel members distributing the product. Fourth, at least for some firms, means are only limited to change perceptions without establishing or acquiring subsidiary operations. (Gordon et al., 1993) Furthermore, one major difference between consumer business and business-to-business market firms is the fact that unlike in the consumer market, in the business-to-business market the gain (or loss) of a few customers can have a huge effect on the manufacturer's bottom line (Gordon et al., 1993).

As mentioned above, channel members play an important role in creating customer loyalty. According to Gordon et al. (1993), in consumer markets, mass communication and mass distribution usually function as a start to creating customer awareness and associations.

[4] What Gordon et al. (1993) call brand equity is considered to equal the definition of brand strength in this study.

Contrary to this, they note that in many industrial product categories, the task of creating customer awareness and associations falls on the channels of distribution. In other words, the brand's image is intertwined with the distributor carrying that brand. Therefore, the importance of having good distributors should not be underestimated.

Branding in business-to-business markets is a somewhat new topic in the field of research and should be still more extensively explored, whereas in consumer business the benefits of branding have been studied more and its importance for firms seems to be clearer. It has been found that in consumer business it is the brand awareness that affects consumer decision making and that strong brand associations enhance brand preference. When talking about business-to-business viewpoint, firms can use strong brands to improve firm's competitiveness and to increase customer loyalty. In the next chapter it will be discussed how brand strength is associated with shareholder value.

3.2 Brand Strength and Shareholder Value

After discussing the components of brand strength, the second section of the literature review concentrates on exploring the association between brand strength and shareholder value. The relationship between brand strength and shareholder value is of interest to this research, since shareholder value is also related to company's risk, and the objective in this study is to find out if there is a connection between risk and brand strength as well. In addition, if brand strength affects the riskiness of a company, it also indirectly this way impacts shareholder value.

Kerin and Sethuraman (1998) state that it is generally claimed that brand name is a corporate asset that creates wealth for firm's shareholders. According to them, until their research the literature had neither provided a comprehensive theoretical basis for this claim nor documented an empirical relationship between brand value[5] and shareholder value. Also Barth et al. (1998) found that intangible assets had only started to be recognized as important determinants of firm value. In addition, Pahud de Mortanges and van Riel (2003)

[5] It is considered that by brand value Kerin and Sethuraman (1998) referred to the same concept, which is called brand strength in this study.

point out that almost no research exists to empirically investigate the relationship between brand equity[6] and shareholder value.

The research by Dutordoir et al. (2010) adds to a growing stream of papers reporting that intangible assets can be a source of tangible (stockholder) wealth. Their findings complement these results by showing that investors seem to consider brand value estimates by external organizations as value relevant information. Their results suggest that brand value[7] can create shareholder value, and that the strength of the impact of brand value on firm value is moderated both by macroeconomic and brand owner characteristics. According to Dutordoir et al. (2010), including brand value measures in performance measurement and compensation schemes could therefore yield several advantages to (branded) firms: it may motivate managers to focus on long-term shareholder value rather than only on short-term accounting profits, and it may provide more insight into managerial efforts and effectiveness in undertaking brand-building activities.

Even if the academic research had been long deficient what it comes to contemplate the relationship between brand equity and shareholder value, it has developed a lot during recent years, according to Bharadwaj et al. (2010). They claimed that there is extent literature examining this relationship. According to them, the shareholder wealth, or shareholder value, consists of three components: stock returns, systematic risk, and idiosyncratic risk. In their study, they found that changes in brand quality[8] enhance shareholder wealth by being positively related to stock returns and negatively associated with changes in idiosyncratic risk. Bharadwaj et al. (2010) point out, however, that unanticipated changes in brand quality are positively related to systematic risk, which implies that they may also erode shareholder wealth. What Lane and Jacobson (1995) found, was that since consumer behavior depends on the consumer perceptions of brand familiarity and customers' attitude toward the brand, these brand equity components influence investor expectations of future cash flows, and therefore the stock price of the firm.

[6] What Pahud de Mortanges and van Riel (2003) call brand equity is considered as brand strength in this study.
[7] It is considered that the definition of brand value by Dutordoir et al. (2010) equals the definition of brand strength in this study.
[8] How Bharadwaj et al. (2010) define brand quality corresponds the definition of brand strength in this research.

The financial market value of a firm arises from the net present value of future cash flows streaming from its tangible and intangible assets, discounted at an appropriate rate and adjusted for inflation and risk. Kerin and Sethuraman (1998) reason that if company brand names represent both an asset and a source of future earnings and cash flows, it could be speculated that they would ultimately lead to increased shareholder value. They continue by stating that if intangible assets increase firm's earnings and cash flows and enhance its market value relative to the replacement cost of its tangible assets, firms with accumulated intangible assets would have a greater likelihood of creating wealth for their shareholders than firms without intangible assets.

Also Srivastava et al. (1998) note that firms with intangible strengths, such as well-known brand names, should have higher net present values because of incremental earnings beyond those associated with only tangible assets. They further state that market-based assets, e.g. brand equity[9], increase shareholder value by accelerating and enhancing cash flows, lowering the volatility and vulnerability of cash flows, and increasing the residual value of cash flows. Figure 1 describes how market-based assets, including brand equity, are linked to shareholder value.

[9] It is considered that what Srivastava et al. (1998) refer to as brand equity, means the same thing that is called brand strength in this study.

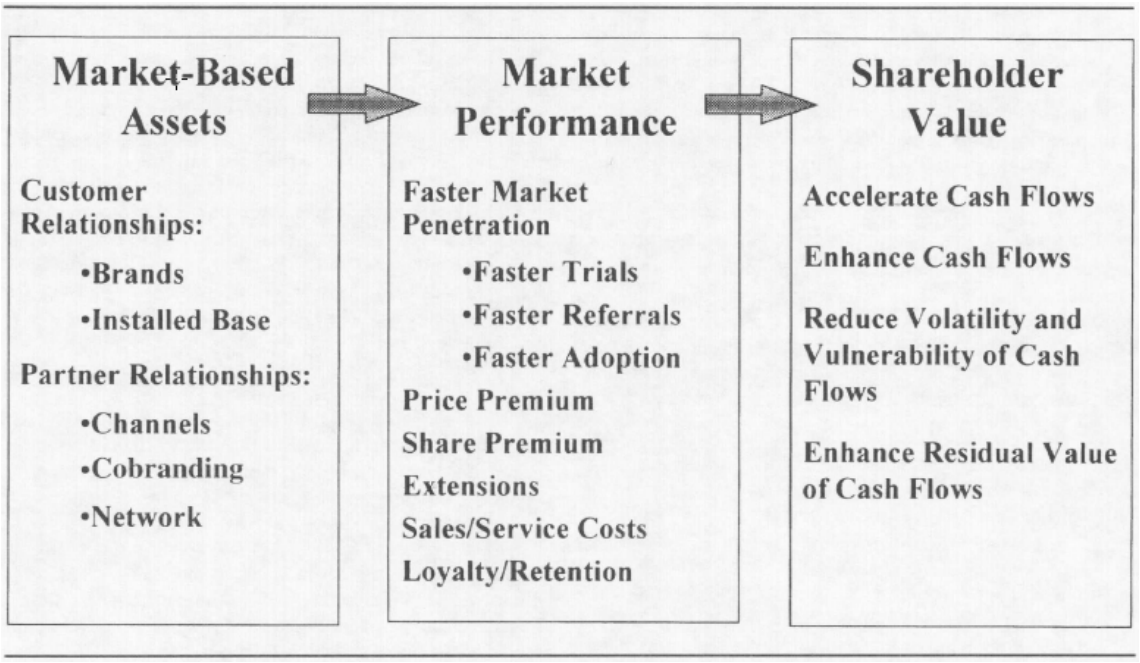

Figure 1: Linking Market-Based Assets to Shareholder Value (source: Srivastava et al., 1998)

Srivastava et al. (1998) stated that market-based assets can increase shareholder value by enhancing cash flows. According to them, cash flows can be enhanced by generating higher revenues, lowering costs, lowering working capital requirements, and by lowering fixed capital requirements. This can be seen in Figure 2. As several researchers have discovered (see e.g. Yoo and Donthu, 2001), well-established and differentiated brands can charge a price premium, which helps to enhance revenues. Srivastava et al. (1998) claim that market-based assets can accelerate cash flows by increasing the responsiveness of the marketplace to marketing activity. Keller's (1993) findings seem to support this. He argues that if brand awareness and brand attitude, both components of brand strength, are positive, customers are likely to respond with greater speed to the marketing efforts of the brands. Thus, when exposed to a familiar brand toward which they have a positive attitude, customers are more likely to try the brand, adopt it, and tell about it to others.

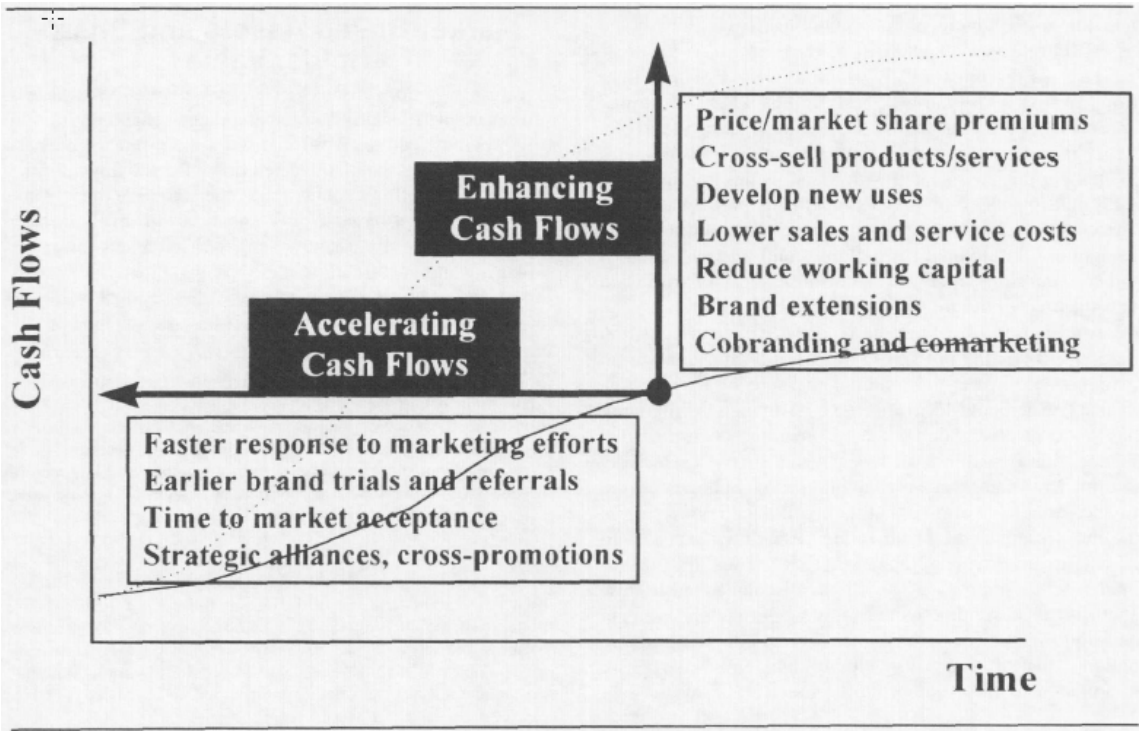

Figure 2: Accelerating and Enhancing Cash Flows (source: Srivastava et al., 1998)

Srivastava et al. (1998) also noted that brand equity is associated with a customer base that is more responsive to advertising and promotions, which results in lower marginal costs of sales and lower marketing costs for higher equity brands. In addition, customer relationships enhance cash flows by reducing the level of working capital and fixed investments. Furthermore, according to Srivastava et al. (1998), market-based assets can lower the volatility and vulnerability of cash flows, which is pictured in Figure 3.

The vulnerability of cash flows is reduced by increasing customer satisfaction, loyalty, and retention. Srivastava et al. (1998) explain that the volatility of cash flows is reduced when the firm's relationship with its customers and channel partners is arranged so that it can provide more stable operations. They continue that also by retaining a large proportion of customers, the volatility can be reduced. The lower volatility and vulnerability of cash flows then result in a lower cost of capital or discount rate, and hence, more stable and predictable cash flows have a higher net present value and create more shareholder value (Srivastava et al., 1998).

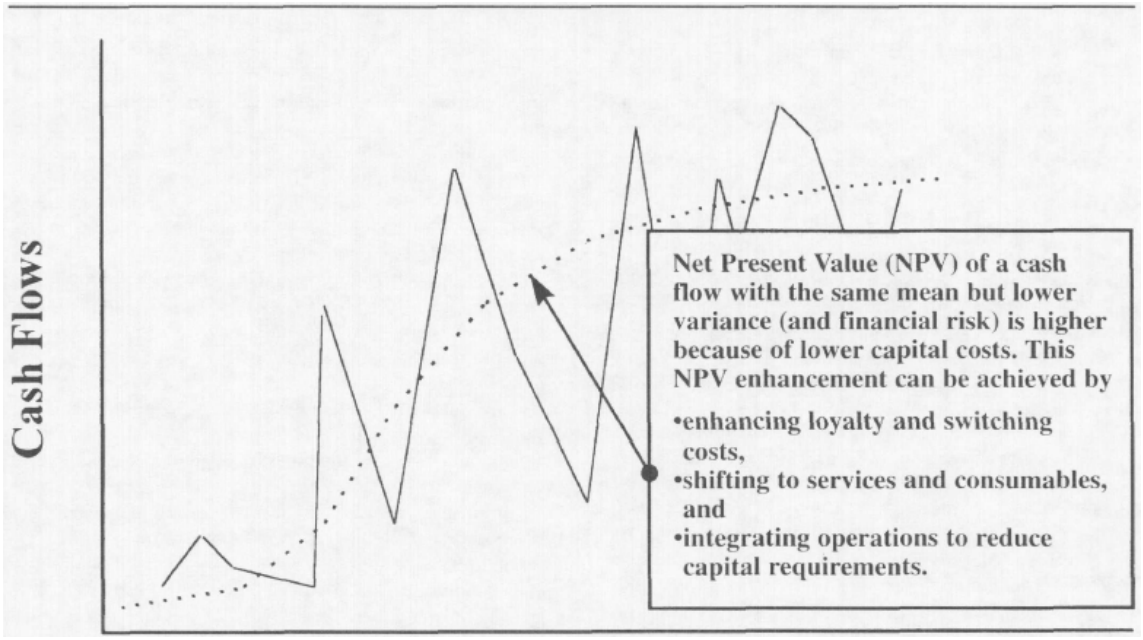

Figure 3: Reducing the Volatility in Cash Flows (source: Srivastava et al., 1998)

According to Pahud de Mortanges and van Riel (2003), brand equity should manifest itself in the market value of the firm, since it is often assumed that brands represent an asset as well as a source of current and future earnings and cash flows for a firm. Due this, brand equity should also have an impact on shareholder value (Pahud de Mortanges and van Riel, 2003).

Torres and Tribó (2011) examined the interaction between shareholder value and customer satisfaction, as well as the impact on a firm's brand equity[10]. Their findings suggest that customer satisfaction may have a positive effect on brand equity. They note, however, that if managers show excessive customer orientation the effect is negative due to reductions in shareholder value.

According to Torres and Tribó (2011), shareholder value, as well as corporate social performance involving all stakeholders in general and customer satisfaction in particular, is relevant to the creation of brand equity. They claim that at high levels of customer satisfaction the firm's financial performance should suffer for two reasons. First, if

[10] Torres and Tribó (2011) use term brand equity in their research, but in this study it is considered to mean brand strength

managers satisfy customers at the expense of the firm's non-customer stakeholders, the latter group will not provide valuable intangible resources, which in turn may damage a firm's brand equity. Second, if managers satisfy both customers and non-customer stakeholders, the resulting policy may represent an entrenchment strategy that a manager implements when confronted with dissatisfied shareholders. This kind of policy is likely to have negative effects on performance, which then again translates into a reduction in brand equity. Torres and Tribó (2011) highlight that managers should take a wide perspective and focus on all stakeholder groups, as well as on shareholders, in order to define successful brand equity value strategy.

Prior research extensively provides evidence on link between brand strength and shareholder value. Several researchers have recognized brand strength as an individual asset for a firm that could increase shareholder value by, among other things, enhancing earnings and cash flows, lowering the volatility and vulnerability of cash flows, increasing the residual value of cash flows, and enhancing a firm's market value relative to the replacement cost of its tangible assets.

The two first chapters of the literature review have concentrated on brand strength while the last two will focus on the main topic of this research: the riskiness of a firm. The next chapter will discuss the sources of both market and business risk.

3.3 Sources of Risk

After thoroughly exploring brand strength, its components and its relationship with shareholder value, this section concentrates on risk in more detail. Some of the numerous components that relate to market and business risk are discussed here, and the attempt has been to find the most relevant ones.

As previously discussed, from the shareholders' point of view total risk can be divided into systematic and unsystematic risk. Systematic risk, which is one of the two risk types studied in this research, can also be called market risk and it reflects the extent to which a stock's return responds to the movement of the average return on all stocks in the market.

It is the part of risk that cannot be diversified away. From the company's point of view, on the other hand, risk can be divided into business and financial risk; business risk being the other risk type under review. It is the uncertainty related to a firm's operating income

3.3.1 Market risk

Stockholders are only compensated for systematic or market risk – risk that they cannot avoid by diversifying their wealth into other securities. According to Chatterjee and Lubatkin (1990), systematic risk accounts for 20-30 percent of the total risk of security. This is very similar to what Bettis (1983) found. He calculated that the typical amount of unsystematic risk is between 50 to 80 percent of total risk, as already brought up in Chapter 2.1, which leaves 20 to 50 percent for systematic risk. If all other things equal, the lower the systematic risk, the lower the required rate of return on an investment, and the higher the value of the firm (Chatterjee and Lubatkin, 1990). Therefore, according to Chatterjee and Lubatkin (1990), stockholders' wealth can be increased by pursuing actions that lower the firm's systematic risk.

Lev (1974) emphasized that knowledge of the real determinants of stock's risk, i.e. those resulting from the firm's input and output decisions, is crucial for decision on both the firm and investor levels. On the firm level, according to Lev (1974), the relationship between operating decisions and risk is important, since the general assumption is that management is attempting to maximize shareholders' wealth. On the investor level, this kind of knowledge improves the prediction of risk and thus portfolio selection (Lev, 1974).

A relationship between a firm's operating decisions and the riskiness of its stocks was found in Lev's (1974) research. He found that, ceteris paribus, the higher the operating leverage, the larger the overall and systematic risk of the stocks. Derived from this, Lev (1974) noted that it can be expected that on the firm level, large capital expenditures associated with an increase in operating leverage will increase stock riskiness. On the investor level, in turn, these findings might assist in the estimation of common stock's risk, but they specifically suggest that when a firm experiences a significant operating leverage change the estimation of risk measures based exclusively on historical returns would be inappropriate.

While Lev (1974) found a relationship between operating leverage and risk, Gahlon and Gentry (1986) further concluded in their research that financial leverage as well as both cyclical nature and volatility of operating earnings can be identified as the real determinants of systematic risk. In their list, growth was mentioned as a fourth possible determinant. Drawn from previous researches they enumerate that also unit sales, fixed costs, contribution margin, and covariance of sales have been specified as being significant influencing factors between the systematic risk of security and its underlying real assets. They still note that the first three variables are used to calculate the degree of operating leverage (DOL) and the degree of financial leverage (DFL).

Similarly to Gahlon and Gentry (1986), Mandelker and Rhee (1984) also studied the impact of operating and financial leverage on the systematic risk of common stock. They note that the capital asset pricing model (introduced already in the early 1960's) postulates that the equilibrium return on any risky security is equal to the sum of the risk-free rate of return and a risk premium measured by the product of the market price of risk and the systematic risk of security. In this model, beta – as an index of systematic risk – is the only security-specific parameter that affects the equilibrium return on risky security.

From previous researches Mandelker and Rhee (1984) conclude that approximately one quarter of systematic risk is explained by financial leverage, and that operating leverage is also one of the real determinants of systematic risk. Their own empirical findings also suggested that the degrees of financial and operating leverage explain a large portion of the variation in beta. Both financial leverage and operating leverage, which were identified as being the determinants of market risk in Lev's (1974), Mandelker and Rhee's (1984), and Gahlon and Gentry's (1986) studies are used in this thesis to explain market risk.

3.3.2 Business risk

Whereas, according to Kinnunen et al. (2006), the direct indicator of business risk (return on assets) is directly measuring the state of risk and uncertainty as the volatility of the firm's profitability, the indirect indicators relate to factors that are partially firm specific and partially industry driven. The amount of business risk is in principle dependent on

sales volume, changes in selling prices and in the prices of factors of production, the firm's ability to adjust the selling prices to the changes in the prices of factors of production, and added to these, on the stiffness of the cost structure. The latter means how much the firm's total costs are dependent on the changes in business volume. The greater the part that fixed costs comprise of the total costs, the stiffer is the firm's cost structure and the greater are the relative changes in operating income when sales volume and sales revenue change a certain percentage. This is called operating leverage, which can be measured by ratios related to the stiffness of the cost structure. (Kinnunen et al., 2006)

Risk can be divided into systematic (market) risk and unsystematic (business risk). The most part of the total risk consists of business risk that can be heavily reduced with effective diversification. From prior literature it can be summarized that financial leverage and operating leverage are most commonly recognized to affect the market risk. When it comes to business risk, not as extensive literature on its sources was found compared to market risk, but it could be identified that ratios measuring the stiffness of the firm's cost structure are related to this risk measure. The next chapter will concentrate on the main interest of this study: the association between brand strength and risk.

3.4 Brand Strength and Risk

The preceding section covered a few sources of risk. The final section of the literature review now explores how the association between brand strength and risk has been perceived in previous researches.

Madden et al. (2006) note that many published analyses have reported a link between branding and the financial performance of a firm. However, they stress that although these studies that indicate a positive relationship between measures of brand equity[11] and stock returns are useful and important for understanding the link between branding and shareholder value, they do not unequivocally constitute evidence of shareholder value creation by brands. According to Madden et al. (2006), to address whether shareholder value is created (or possibly destroyed) it should be recognized that shareholder value is

[11] It is considered that what Madden et al. (2006) call brand equity in their research equals the definition of brand strength in this study.

both relative (opportunity cost) and risk-adjusted concept. That is, shareholder value is not created simply through positive stock returns or increased market capitalization; rather, it occurs if, and only if, a company's stock returns are higher than any returns the company's shareholders might receive from the alternative investments of similar risk.

The results from the research conducted by Madden et al. (2006) extend previous research by showing that strong brands not only deliver greater returns to stockholders than does a relevant benchmark but do so with less risk, even when market share and firm size are considered. Their research extends previously published studies that have correlated stock prices and brand value and demonstrates that changes in brand equity are associated with changes in value of the firm. What Madden et al. (2006) unambiguously found, is that firms that have developed strong brands create value for their shareholders by yielding returns that are greater in magnitude than a relevant market benchmark, and with less risk.

McAlister et al. (2007) brought up that recent developments in the market-based assets theory suggest that a firm's advertising creates intangible market-based assets (e.g. brand equity[12]) and that these assets strengthen performance – including sales growth, market share, and profitability – and shareholder value. They continued by suggesting that the consumer loyalty and the bargaining power over distribution channel partners inherent in these intangible market-based assets help insulate the firm from the impact of stock market downturns, thus lowering the firm's systematic risk.

For their research McAlister et al. (2007) gathered from previous literature why increased advertising and the resultant brand equity might lower a firm's systematic risk. They list that brand equity increases the differentiation of firm's products and make them less easily substitutable, thus also increasing price premiums and lowering price sensitivities. Furthermore, they state that higher brand equity produces an asymmetric sales response to sales promotions, such that highly advertised brands are affected less by competitors' sales promotions, and that brand equity also strengthens and stabilizes the firm's performance in new product markets. Added to this all, McAlister et al. (2007) note that brand equity creates both consumer and distributor loyalty, acts as a barrier to competition, and provides

[12] How McAlister et al. (2007) determine brand equity is considered equivalent to the definition of brand strength in this study.

bargaining power over distributors, which are all benefits that insulate a firm's stock from market downturns and thus lower its systematic risk. Finally, they found that a firm's brand equity may lower its systematic risk by serving as a capital market information channel for the firm's stockholders.

According to Dutordoir et al. (2010), the stock market reacts more strongly to a given brand value change for firms with a large portion of intangible assets in their asset structure. For such firms, having a strong brand may be more important than for firms whose asset structure mainly consists of tangible assets. They note, however, that market reactions tend to be more favorable for brand owners that allocate a smaller portion of their resources to advertising. This is somewhat contradictory to what McAlister et al. (2007) found, since they claimed that brand equity is a result of increased advertising and that they both have a decreasing impact on firm's systematic risk.

Prior research has shown that strong brand names induce greater customer loyalty, less vulnerability to competitors, larger margins, and more inelastic responses to price increases (Dutordoir et al. 2010). These are results of the same kind that McAlister et al. (2007) found being due to increased advertising. Dutordoir et al. (2010) refer to the efficient market hypothesis by Fama 1960's and state that stock prices immediately incorporate any information that changes stockholders' expectations about the firm's future cash flows. Thus, they reason that to the extent that these potential brand-related advantages translate into higher expected future cash flows, brand value should have a positive impact on firm value.

The study by Bharadwaj et al. (2010) examined the impact of changes in brand quality that are unanticipated by investors on three components of shareholder wealth: stock returns, systematic risk and idiosyncratic risk. Bharadwaj et al. (2010) found that such changes in brand quality enhance shareholder wealth by being positively associated with stock returns and negatively related to changes in idiosyncratic risk. They noted, however, that unanticipated changes in brand quality can also erode shareholder wealth as they have a positive association with changes in systematic risk.

The results showed that when firms do not trade off increases in current period earnings for changes in brand quality, firms are rewarded with enhanced stock returns and lowered systematic risk. Similarly, brand quality is valuable for firms, since the positive impact of unanticipated increases in brand quality on stock returns is larger when facing increasing competition. (Bharadwaj et al., 2010)

Bharadwaj et al. (2010) found that unanticipated changes in brand quality are positively associated with stock returns and negatively associated with changes in idiosyncratic risk. However, as already mentioned above, according to Bharadwaj et al. (2010), unanticipated changes in brand quality are also positively associated with changes in systematic risk, i.e., unanticipated increases (decreases) in brand quality can make stock return more (less) sensitive to stock market movements. In addition, an unanticipated increase in current-period earnings enhances the positive impact of unanticipated changes in brand quality on stock returns but mitigates their deleterious effects on changes in systematic risk. They also state that unanticipated changes in brand quality are more valuable in more competitive industries, as their positive effects on stock returns are stronger and their deleterious effects on systematic risk are weaker in such industries.

As Bharadwaj et al. (2010) put it: “by fostering brand loyalty, increases in brand quality help firms attract and retain customers during a market downturn”. This is why the expected cash flows of such firms are less affected by downturns. However, Bahradwaj et al. (2010) argue that if higher brand quality is associated with higher prices, then unanticipated increases (decreases) in brand quality, are likely to make the brand more (less) vulnerable to downturns. According to them, this is because during downturns consumers become more price conscious and are likely to cut down on the purchase quantities of high quality brands. In addition, loyal customers also tend to be price sensitive when making purchase decisions during downturns. In contrast, high quality brands benefit from market upswings as consumers are more likely to purchase them. This suggests that an unanticipated increase in brand quality is likely to make cash flows more vulnerable to stock market movements, that is, increase systematic risk. (Bharadwaj et al., 2010)

The effects of unanticipated changes in brand quality on stock returns and changes in idiosyncratic risk are likely to be stronger in the presence of unanticipated increases in current-period earnings. In addition, in unanticipated changes in brand quality have a negative impact on changes in systematic risk then these effects will be stronger in the presence of unanticipated increases in current-period earnings. (Bharadwaj et al., 2010)

To conclude, Bharadwaj et al. (2010) found that while unanticipated changes in brand quality can enhance stock returns and lower idiosyncratic risk, they can also make a firm's stock returns more vulnerable to the stock market movements. According to Bharadwaj et al. (2010), the challenge for managers is to harvest the benefits of brand quality without increasing systematic risk. They stress that managers should adopt a joint focus on building brand quality and ensuring that current-period earnings are not compromised.

The major part of the existing literature has concentrated on studying the relationship between brand strength and the firm's systematic risk. Capital asset pricing model (CAPM) emphasizes that investors can diversify the business risk away, so they only worry about the market risk of a stock, beta. Thus, based on CAPM, it is easy to assume that corporate managers should not be concerned with reducing firm-specific risk, since it should not have any effect on their firm's stock returns (Bettis, 1983). However, Amit and Wernerfelt (1990) notice that low business risk allows firms to acquire factors of production at lower costs, to operate more efficiently, or both. Moreover, according to Bettis (1983), managing business risk lies at the heart of competitive strategy. He stated that theorists had depicted the management of business risk: "as central to organizational evolution, a determinant of which organizations survive and grow, and which decline and die".

According to Amit and Wernerfelt (1990), the level of business risk should not necessarily be indifferent to shareholders. First, they note that managers might seek to reduce the probability of bankruptcy in order to enhance their job security by taking actions to reduce business risk that could be detriment to shareholders. Also, if managers are compensated on the basis of the firm's earnings, they prefer a stable earnings stream, and might thus take a variety of risk reducing actions, again, at the expense of shareholders. Second, in unstable environments firms' operations are less effective and earnings more volatile than in stable environments. However, low business risk allows firms to acquire inputs cheaply

and to operate efficiently. From this it is derived that reduced business risk enhances a firm's market value in industries that are less than perfectly competitive, suggesting that lower business risk is associated with higher cash flows. Finally, transaction costs, such as brokerage fees and time costs prevent shareholders to completely diversifying the business risk away. The overall riskiness of the portfolio is thus reduced by holding stock with low total risk, meaning that shareholders are willing to accept lower return on stock with lower business risk. From all this derives that if brand strength affects the business risk, either by lowering or increasing it, it is in the interest of the shareholders as the level of business risk might have a positive or negative influence on them. For this reason it is also in the interest of this study.

The association between brand strength and the riskiness of a company has not yet been overly extensively researched. Several studies covering this topic could be found, but they were mainly related to the association between brand strength and market risk. It was found that business risk should matter also for investors, but thus far the impact of brand strength on business risk has not been examined. The core finding from previous studies was that it seems that strong brands should not only deliver greater returns to stockholders that relevant benchmark but do so with lower risk.

It has been shown that strong brand names result in a greater customer loyalty, smaller vulnerability to competitors, larger margins, and more inelastic responses to price increases. It also became apparent that the relationship between brand strength and a firm's systematic risk has been more common as a research topic than the relationship between brand strength and business risk. Simple interpretation of the capital asset pricing model gives an impression that business risk should not be in the interest of investors. It was discovered, however, that managing the business risk lies at the heart of competitive strategy, and can actually have influence on whether the firm will live and grow or decline and eventually die.

Next part of this research will be the empirical analysis. First, the main hypotheses will be presented after which data and study period are described. Then, the descriptive statistics, correlation matrices and regression analyses will be presented and the results will be discussed in more detail.

4. HYPOTHESES

In this chapter, the hypotheses for the empirical research and the reasoning behind them will be presented. The first two hypotheses relate to the association between risk and brand strength, whereas the third one also takes into account the impact of the industry (consumer business versus business-to-business).

The main objective of this study is to explore the association between brand strength and the riskiness of a company. The fundamental assumption is that companies with strong brands are less risky, i.e. there is a negative association between brand strength and the riskiness of a company. This assumption is based on the same reasoning that Bharadwaj et al. (2010) used when forming their second hypothesis. They reasoned that increases in brand quality help firms to attract and retain customers during a market downturn, due which the expected cash flows of such firms are also less affected by downturns. In contrast, market-wide factors and the loss of customers cause falls in cash flows for companies with a decline in brand quality. Based on this, the following hypothesis is formed:

> *H1: There is a negative association between brand strength and the riskiness of a company.*

On the other hand, Bharadwaj et al. (2010) present that higher brand quality is associated with higher prices. Since during downturns consumers become more price conscious and are likely to cut down on the purchase quantities of high quality brands, increases in brand quality, in fact, make the brands more vulnerable to downturns. According to Bharadwaj et al. (2010), this kind of behavior is also typical of loyal customers. From this reasoning they draw a conclusion that "unanticipated increase in brand quality is likely to make cash flows more vulnerable to stock market movements". Based on this, the following hypothesis is formed:

> *H2: There is a positive association between brand strength and the riskiness of a company.*

The two hypotheses presented above constitute the core of this research. However, I also wanted to further test if the industry affects the possible association between brand strength and the riskiness of a company. In prior research, it has been concluded that in consumer markets the importance of a strong brand is fairly self-evident. When it comes to business-to-business markets, it was brought up by Mudambi (2002) that the nature and importance of branding in business-to-business markets in still unclear and should be further researched. However, she noted that business-to-business branding can be beneficial in terms of sustainable differentiation and increased customer loyalty. In chapter 3.1.2 there were also listed he differences between branding in consumer and business-to-business markets.

Regardless of these findings, one might still assume that brands are more valuable to companies operating in consumer business, since individual consumers are influenced by advertising every day and the images they have on certain products lead their buying decisions. In contrast, firms operating in a business-to-business market are more likely to base their business decisions on more thorough analysis than the brand image. Based on this reasoning, the following hypothesis is formed:

> *H3: The association between brand strength and the riskiness of a company is dependent on whether the firm operates in consumer versus business-to-business market.*

These hypotheses will be tested in the empirical analysis part in chapter 7.3, and it will be reported whether or not the results provide support for them. Next chapter will focus on the data and the study period of this research.

5. DATA

The hypotheses were presented in the last chapter. In this chapter, the data and study period will be described in more detail.

5.1 Data

The statistical analysis of this research explores the relationship between brand strength and the riskiness of a company. The data of brand strength is obtained from calculations done by the British Brand Finance in cooperation with the Finnish BrandWorxx. Brand Finance is an independent world's leading brand valuation consultancy. In 2008, it published top 100 Finnish brands that were rated based on 2007 numbers. The financial statement information needed to conduct the statistical analysis will be obtained from Thomson One Banker database.

Brand Finance determines the strength of the brand by using Brand Finance's ßrandßeta® analysis. This analysis benchmarks the strength, risk and potential of a brand, relative to its competitors, on a scale ranging from AAA to D. The definitions for these ratings can be seen from Table 1. It is conceptually similar to a credit rating. Factors that were included in the brand rating were, among others, market concentration, marketing investment levels, sales growth, market share growth, consumer awareness, functional quality perceptions, image or emotional perceptions, and brand preference and brand loyalty. It can be seen than there are several factors that were listed as brand equity components by researchers in this field (see e.g. Aaker 1991, Keller 1993, and Srinivasan et al. 2005). The data used to calculate the ratings comes from various sources, including Bloomberg annual reports and Brand Finance research. (Brand Finance)

Brand Rating	Strength
AAA	Extremely Strong
AA	Very Strong
A	Strong
BBB-B	Average
CCC-C	Weak
DDD-D	Failing

Table 1 provides the brand rating done by Brand Finance.

Table 1: Brand rating

There are other brand consultancies as well. E.g. Dutordoir et al. (2010) and Madden et al. (2006) used the Interbrand Best Global Brands list. The reason why Interbrand's brands listing could not be used in this research is the fact that the final value based on which Interbrand lists the brands is not the sole brand strength value, but consists of three key aspects: a) financial performance, b) the role of brand in the purchase decision process, and c) brand strength. In addition to this, the brand strength that Interbrand uses is comprised of ten factors, some of which do not belong to brand strength as I have defined it in this study.

Kerin and Sethuraman (1998) as well as Barth et al. (1998) used brand values published in FinancialWorld (FW). FW has published brand value estimates each year since 1992 and it is known for its annual list of "The World's Most Valuable Brands". According to Kerin and Sethuraman (1998), the FW methodology resembles the approach used by Interbrand, and thus it is not suitable for this study.

5.2 Study Period

Brand Finance and BrandWorxx published the results of top 100 Finnish brands in September 2008 based on 2007 figures. Due this, the independent, explanatory variables will be also calculated from 2007 figures. However, since this research is studying whether brand strength affects the riskiness of a company, the risk measures should be calculated from a later period than brand strength, in order to find true causality.

Beta can be computed on a monthly basis from the following period to get enough observations, but the return on assets (ROA) needs to be calculated from yearly data. To be able to obtain a big enough number of observations for calculating the variance of ROA, I will use financial statement information from 2002 to 2011 on this variable. The reason for choosing a 9-year time period instead of maybe more logic 10 years was that many of the sample firms lacked the needed information from year 2001 and including that fiscal year into the study period would have caused the sample size to considerably decrease. It needs to be noted that in order to get more accurate results it would be better, if the time period covered more years after calculating the brand strength, which, however, naturally was not possible in this study.

6. RESEARCH METHODOLOGY

After describing the data and study period in last chapter, the regression models will be presented here. In addition, this chapter provides a more detailed description on all the variables.

6.1 Research Design

The effect of brand strength on the riskiness of a company will be measured by conducting a statistical analysis. The statistical analysis will be conducted using SPSS. The methods used include descriptive statistics, correlation analysis and multiple linear regression analysis.

Multiple linear regression analysis is the main research method used in this research, and it is an approach to modeling the relationship between a dependent variable and more than one explanatory variables. The method implicitly assumes that there is causality between the variables. In the regression equation the dependent variable is modeled as a function of the explanatory variables, corresponding parameters, and an error term. The error term captures all other factors that influence the dependent variable other than the explanatory variables.

The regression analysis is conducted separately for both of the dependent variables, average beta and variance of ROA. The regression equations used in this research are the following:

$$AvgBeta_j = \alpha_0 + \alpha_1 BSind_j + \alpha_2 BSIndust_j + \alpha_3 Industry_j + \alpha_4 LnTA_j + \alpha_5 PB_j + \alpha_6 FL_j + \alpha_7 OL_j + \varepsilon_j \quad (1)$$

and

$$VarROA_j = \alpha_0 + \alpha_1 BSind_j + \alpha_2 BSIndust_j + \alpha_3 Industry_j + \alpha_4 LnTA_j + \alpha_5 PB_j + \alpha_6 OL_j + \alpha_7 PF_j + \varepsilon_j, \quad (2)$$

where

α = intercept

$AvgBeta_j$ = market risk in company j, measured by the average of its monthly stock beta during 2008

$VarROA_j$ = business risk in company j, measured by the variance of its yearly return on assets over the period of 2002-2011

$BSind_j$ = brand strength index of company j

$BSIndust_j$ = multiple of brand strength index and industry dummy in company j

$Industry_j$ = industry dummy (1 = consumer business, 0 = business-to-business) of company j

$LnTA_j$ = natural logarithm of total assets of company j

PB_j = price-to-book ratio for company j

FL_j = financial leverage of company j

OL_j = operating leverage of company j

PF_j = personnel costs per fixed assets in company j, and

ε_j = error term.

To test for the robustness of the results, I will measure business risk by also using a trend cleaned return on assets and the variance of change in return on assets. For these calculations the formulas will be equal to the formula of the variance of ROA.

After presenting the regression models in this section, the variables are defined in chapter 6.2. It will also be discussed why these variables were chosen.

6.2 Variables in This Research

This study aims at finding evidence if brand strength affects the riskiness of a company. There are two dependent variables in this research, beta to measure for market risk and the variance of return on assets to measure for business risk. Brand strength is the test variable and the multiple of brand strength index and industry dummy, industry dummy, natural logarithm of total assets, price-to-book ratio, financial leverage, operating leverage and

personnel costs per fixed assets are the independent variables. This chapter will define all the variables and explain why they were chosen to the regression models.

6.2.1 Dependent Variables

Market risk

I will use beta for measuring market risk. The stock market, as a whole, has a beta of 1.0. A stock whose return falls (or rises) more than the market's return falls (or rises) in response to a change in the market has a beta greater than 1.0. If a stock's return falls (or rises) less than the market's return falls (or rises) in response to a change in the market, its beta is less than 1.0.

McAlister et al. (2007) examined beta as a risk measure. According to them, systematic risk is an important metric for publicly listed firms that measure their stocks' vulnerability to market downturns. A review of current investment practices indicates that leading investment firms use beta extensively in the construction of investment portfolios. Thus, shareholders and senior management of publicly traded firms are interested in beta and, consequently, in the impact of advertising on beta. (McAlister et al., 2007)

Beta is widely recognized as the measure of systematic risk. I will calculate the beta for each company as an average of monthly betas in 2008. The brand strength data is from 2007, so betas will be calculated from 2008 in order to test for the causality. The monthly betas are calculated in the following way:

$$\textit{Monthly Beta} = (\textit{Slope of Daily Stock Returns} / \textit{Daily Market Return}) - \textit{Monthly Risk-Free Rate of Return} \quad (3)$$

I have used Euribor as the monthly risk-free rate of return. Data for daily returns is obtained from Thomson One Banker database.

Business risk

Business risk will be measured by using the variance of return on assets (ROA). ROA is an indicator of how profitable a company is relative to its total assets. It gives an idea as to

how efficient management is at using its assets to generate earnings. The standard deviation of the rate of return is a measure of risk (Bodie et al, 2008). ROA can be calculated as:

$$\textit{Return on assets} = \textit{EBIT} / \textit{Total Assets} \quad (4)$$

I will use this formula without any adjustments to calculate ROA for each company for years 2002-2011, after which I will take a variance from these yearly numbers. Both net income and total assets are obtained from Thomson One Banker database and are used as percentages. For robustness tests, I will also calculate a trend cleaned variance of ROA, which depicts that part of the risk that is not explained by the linear trend, and the variance of change in ROA.

The trend cleaned variance of return on assets is formed by first calculating a correlation between year and return on assets for all the sample companies and then taking a square of this number. This number is the part of the variance of ROA that is explained by time (year) and let's mark it with $Corr^2$. $(1\text{-}Corr^2)$, then again, is the part of the variance of ROA that time (year) does not explain. Finally, $(1\text{-}Corr^2)$ is multiplied with the variance of ROA, in order to get the trend cleaned variance of return on assets, in other words the part of the risk measure that is not explained by the linear trend.

The variance of change in return on assets is calculated simply by first computing the yearly change in return on assets for every sample company and then taking a variance of these figures.

6.2.2 Test Variable

Brand strength

Brand strength estimates for the sample are obtained from Brand Finance's calculations based on 2007 numbers. Brand Finance has given each brand a brand rating on a scale from AAA to D, which is converted into indexes on a scale from 10 to 1, which will be used the regression analysis.

I will also conduct an additional test by converting the brand strength index into a dummy variable (indexes from 1 to 4 = 0 and indexes from 5 to 10 = 1). This extra test with the brand strength indexes converted into dummy variables will be done as SPSS expects all the variables to be continuous and index valuation of 10-1 is not continuous. The basis for this allocation between consumer business and business-to-business market is presented in Appendix 11.

6.2.3 Control Variables

Total assets

The total assets variable is obtained from Thomson One Banker database. It should be noted that Finnish listed companies are not very normally distributed based on size. There are a few companies that are notably bigger than the rest of the companies. Due this reason I have taken a natural logarithm of the total assets to even up the dispersion. As such, the natural logarithm of total assets is added to the equation as a control variable to control the firm size. According to Fama and French (1992), size is one of the two easily measured variables that combine to capture the cross-sectional variation in stock returns, the other one being market-to-book ratio.

Price-to-book

Price-to-book ratio (or P/B ratio) is used to compare a company's current market value to its book value. It is also known as the price-to-equity ratio, and can be calculated by dividing the current closing price of the stock by the latest quarter's book value per share. Thomson Banker used following formula in its calculation:

P/B Ratio = Market Capitalization for the Fiscal Year / Total Equity for the Same Period (5)

Market capitalization Thomson Banker calculated as total common shares outstanding multiplied by fiscal period price close. It should be noted that P/B ratio varies by industry. Still, a lower ratio could mean that either the stock is undervalued or that there is something wrong with the company. A higher P/B ratio implies that investors are expecting management to create more value from the given assets, all else equal. Added to

this, the ratio indicates whether you are paying too much for what would be left, if the company went bankrupt immediately.

As reported by Fama and French (1992), size, leverage and book-to-market equity can all be regarded as different ways to scale stock prices, to extract the information in prices about risk and expected returns. Book-to-market ratio attempts to identify undervalued or overvalued securities. In this research, price-to-book ratio is used instead of book-to-market ratio as a control variable.

Financial leverage

Financial leverage indicates the extent to which the business relies on debt financing. A high financial leverage ratio indicates possible difficulty in paying interest and principal while obtaining more funding, so highly leveraged companies might be at risk of bankruptcy. However, financial leverage can also increase the shareholders' return on investment and often there are tax advantages associated with borrowing.

Financial leverage ratio is also referred to as the debt to equity ratio. Hence, in this research the financial leverage is calculated using the formula:

$$\textit{Financial Leverage} = \textit{Total Debt} / \textit{Total Equity} \qquad (6)$$

Both variables are obtained from Thomson One Banker database. Several studies have reported theoretical link between financial leverage and beta (see e.g. Gahlon and Gentry, 1986). According to the theory, the higher the financial leverage, the higher the beta. (Foster, 1986)

Operating leverage

Operating leverage refers to the ratio of fixed to variable costs. It is a measure of how revenue growth translates in operating income. There are previous researches reporting an association between operating leverage and firm's systematic risk (see e.g. Lev 1974, and Gahlon and Gentry 1986). According to previous studies, the higher the operating leverage, the higher the beta. One problem in empirically testing the effect of operating leverage on beta is the difficulty of estimating the fixed and variable cost components of a

firm. (Foster, 1986) Kinnunen et al. (2006) also reported that operating leverage can be used as an indirect indicator of business risk, as it measures the stiffness of the firm's cost structure.

Operating leverage can be computed as the percent change in EBIT relative to percent change in net sales. The higher this ratio is, i.e. the more volatile EBIT is relative to the volatility of net sales, the greater the operating leverage for the firm that is caused by fixed operating expenses. (Reilly & Brown, 2012) Since there were numerous cases with this data where the percentual changes of EBIT and net sales were divergent, I will not use this formula to calculate the operating leverage. Instead, I will use a calculation that Kinnunen et al. (2006) stated could be used to, at least indicatively, measure operating leverage:

$$\textit{Operating Leverage} = \textit{Fixed Assets} / \textit{Total Assets} \quad (7)$$

Both components of the variable are obtained from Thomson One Banker database. Fixed assets ratio was not directly available in Thomson One Banker database, so it was calculated as the remainder of total assets minus current assets.

As Lev (1974) puts it, a higher operating leverage refers to a higher share of fixed costs relative to variable costs. He states that given the substitutability among production factors, the degree of operating leverage can be substantially changed by managerial decisions. Thus, according to Lev (1974), for example an increase in the capital intensiveness of the production process will result in an increase in the relative share of fixed costs to variable costs.

Industry dummy

Industry dummy is used in this study to control for the possible effect that a certain industry might have on risk. The industries are divided to consumer business and business-to-business sectors. The companies are divided into these two groups based on customer information in the 2011 annual reports.

Business-to-business companies are given the value of zero (0) and consumer business companies the value of one (1). In other words, if the customer base of the company

comprises of other companies (e.g. distributors, wholesalers etc.) then the firm is marked as belonging to business-to-business sector. Vice versa, companies selling their products directly to end users are marked as customer business companies. In cases where such information could not be found the division was made e.g. based on the nature of business. It should be noted, however, that some subjectivity was also used when making the division, since some of companies belong to both groups. The basis for this allocation is presented in Appendix 11.

Personnel costs per fixed assets

The stiffness of the cost structure is an indirect indicator of business risk (Kinnunen et al., 2006), as it has already been brought up in chapter 3.3.2. Operating leverage can also be used as a measure of this phenomenon, and it is already determined above, but I will furthermore include another ratio that measures the stiffness of the cost structure. It is calculated as:

$$\textit{Stiffness of the cost structure} = \textit{Personnel Costs} / \textit{Fixed Assets} \quad (8)$$

Both components of the variable are obtained from Thomson One Banker database. As already mentioned under the definition of operating leverage, fixed assets ratio was not directly available in Thomson One Banker database but was calculated as the reminder of total assets minus current assets, which were both obtained from the database.

7. EMPIRICAL ANALYSIS

The results of the empirical analysis of this research will be presented in this chapter. Descriptive statistics, correlations analysis and multiple linear regression analysis will be presented separately, each in their own section.

7.1 Descriptive Statistics

Descriptive statistics give an idea of what kind of values the variables get: the number of observations, mean, and variation. These statistics are used to summarize a large set of data by a few meaningful numbers. They are not statistical tests and thus cannot be used to test the hypotheses.

The sample included 17 companies that did not have operating income information available for all the years between 2002 and 2011, due to which it was not possible to calculate ROA for these companies for the whole observation period. For this reason, these 17 companies will not be included in the empirical analysis. The final data sample consists of 83 companies. Companies that were excluded from the analysis were Affecto, Amer Sports, Marimekko, Nurminen Logistics, Oriola-Kd, Orion, Outotec, Salcomp, Scanfil, Soprano, SRV Group, Stonesoft, Stromsdal, Suomen Terveystalo, Tecnotree, Tiimari and Vaisala.

The final data sample of the top 100 Finnish brands presented in table 2 includes values for price-to-book ratio for only 81 companies, since two of the companies lacked information relevant to calculating this variable and SPSS automatically excluded it from the analysis. These companies were Aldata Solution and Biotie Therapies. Also operating leverage could be calculated for only 81 companies, and the two missing companies were Pohjola Pankki and Sampo. Four companies lacked relevant information to calculate personnel costs per fixed assets, so this variable was available for only 79 companies. The companies left out were Aldata Solution, Pohjola Pankki, Sampo and Tectia Oyj.

The descriptive statistics of the variables for the sample companies are presented in table 2. The table shows the number of observations, the mean and median values of these variables, and their standard deviation. Also minimum and maximum values are included.

	Nobs	*Mean*	*Median*	*Std. Deviation*	*Min*	*Max*
Dependent variables						
AvgBeta	83	0.506	0.401	0.372	-0.076	1.440
VarROA	83	0.013	0.004	0.036	0.000	0.299
Test variable						
BSind	83	4.723	5.000	1.883	1.000	10.000
Control variables						
BSIndust	83	0.795	0.000	1.999	0.000	10.000
Industry	83	0.145	0.000	0.354	0.000	1.000
LnTA	83	19.453	18.965	2.043	15.210	24.350
PB	81	2.479	2.099	1.699	0.585	8.788
FL	83	0.608	0.489	0.915	-2.133	6.604
OL	81	0.502	0.490	0.228	0.007	0.994
PF	79	0.900	0.577	1.233	0.004	9.984

Table 2 provides the descriptive statistics of the variables. AvgBeta is the market risk in a company measured by the average of its stock beta during 2008; VarROA is the business risk in a company, measured by the variance of ROA over the period 2002-2011; BSind is the brand strength index on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets.

Table 2: Descriptive statistics of the variables

Sample mean is the average of data collected. The median is the ranked value that lies in the middle of the data. It is the point that divides a distribution of scores into two equal halves. Standard deviation tells us how much all the scores in a dataset cluster around the mean. A large standard deviation indicates a more varied data scores.

The mean value for average beta (0.506) is higher than the median value (0.401), which indicates that the data set for this variable is not totally symmetrical but slightly skewed to the right. For the variance of ROA the mean (0.013) is also higher than median (0.004) with the same interpretation. The mean values for the multiple of brand strength index and industry dummy (0.795), industry (0.145), natural logarithm of total assets (19.453), price-to-book (2.479), financial leverage (0.608), operating leverage (0.502), and personnel costs per fixed assets (0.900) and are higher than the median values, indicating that these variables are also skewed to the right. For brand strength, the median is greater than the mean indicating that the variable is skewed to the left. For operating leverage, the mean and median values are close to each other indicating that the variable is quite normally distributed.

The standard deviation helps to know how a set of data is clustered or distributed around its mean (Levine et al., 2006). For all the variables the standard deviation is rather small, indicating that the data is concentrated.

7.2 Correlation Analysis

The correlation between two variables reflects the degree to which the variables are related. The most common measure of correlation is the Pearson's correlation. The value for a Pearson's can fall between 0.00 (no linear correlation) and +/-1.00 (perfect correlation). The negative sign means that the two variables are inversely related, that is, as ne variable increases the other one decreases. However, a high correlation does not give the evidence to make cause-and-effect statement. Spearman’s rho (or Spearman’s rank correlation coefficient) differs from Pearson’s correlation only in that the computations are done after the numbers are converted to ranks.

The correlation analysis does not only test the correlation between the dependent and independent variables, but also the correlation between the independent variables. Correlation between independent variables indicates a potential multicollinearity in the regression analysis. Multicollinearity does not reduce the predictive power or reliability of

the model as a whole; it only affects calculations regarding individual variables. In the regression analysis, tolerance and the variance inflation factor (VIF) quantify the severity of multicollinearity. The table showing the multicollinearity will be presented in chapter 7.4.

Table 3 presents the results of the correlation matrix for the 83 sample firms (except 81 for price to-book ratio, 81 for operating leverage and 79 for personnel costs per fixed assets). The Pearson correlation estimates are presented below the diagonal and the Spearman rank correlation coefficients above the diagonal. In the table, all the coefficients that have significant correlation at 1% or 5% significance level (two-sided test) are presented in **boldface**.

	AvgBeta	*VarROA*	*BSind*	*BSIndust*	*Industry*	*LnTA*	*PB*	*FL*	*OL*	*PF*
AvgBeta		**-0.317****	**0.277***	0.091	0.104	**0.633****	0.207	0.062	-0.052	-0.098
		0.003	0.011	0.414	0.348	0.000	0.063	0.578	0.644	0.389
VarROA	-0.184		**-0.288****	-0.072	-0.036	**-0.545****	0.085	**-0.365****	**-0.278***	**0.308****
	0.097		0.008	0.515	0.748	0.000	0.449	0.001	0.012	0.006
BSind	**0.291****	-0.168		0.085	0.029	**0.370****	0.101	0.006	0.005	-0.188
	0.008	0.129		0.444	0.794	0.001	0.368	0.957	0.963	0.097
BSIndust	0.084	-0.042	**0.221***		**0.942****	**0.238***	-0.053	-0.041	0.100	-0.086
	0.453	0.708	0.044		0.000	0.030	0.638	0.713	0.377	0.450
Industry	0.073	-0.030	0.061	**0.870****		**0.269***	-0.003	-0.077	0.103	-0.097
	0.514	0.787	0.585	0.000		0.014	0.979	0.488	0.361	0.396
LnTA	**0.683****	**-0.320****	**0.396****	**0.340****	**0.312****		-0.009	0.184	0.217	**-0.434****
	0.000	0.003	0.000	0.002	0.004		0.937	0.096	0.052	0.000
PB	0.194	0.169	0.118	0.019	-0.021	0.015		-0.190	-0.119	**0.320****
	0.083	0.132	0.296	0.864	0.853	0.896		0.088	0.298	0.004
FL	0.003	**-0.300****	-0.133	-0.065	-0.075	0.018	-0.212		**0.458****	**-0.244***
	0.977	0.006	0.232	0.560	0.503	0.870	0.057		0.000	0.030
OL	-0.027	-0.096	-0.012	0.029	0.074	**0.234***	-0.180	**0.272***		**-0.698****
	0.814	0.393	0.919	0.795	0.509	0.035	0.112	0.014		0.000
PF	-0.069	0.142	-0.205	-0.090	-0.099	**-0.408****	**0.265***	-0.146	**-0.506****	
	0.544	0.212	0.069	0.430	0.386	0.000	0.019	0.198	0.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3 provides the correlation matrix of the variables. AvgBeta is the market risk in a company measured by the average of its stock beta during 2008; VarROA is the business risk in a company, measured by the variance of ROA over the period 2002-2011; BSind is the brand strength index on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets.

Table 3: Correlation matrix of the variables

Pearson correlation

Pearson correlation estimates imply that average beta is positively and statistically significantly correlated with brand strength index at 1% significance level (0.291) and with the natural logarithm of total assets at 1% significance level (0.683). As it can be seen from table 3, it seems that, according to Pearson correlation, there is no statistically significant correlation between the two dependent variables, average beta and the variance of ROA. Variance of ROA is negatively and statistically significantly correlated with both the natural logarithm of total assets (-0.320) and financial leverage (-0.300) at 1% significance level.

Brand strength index is positively and statistically significantly correlated with the multiple of brand strength index and industry dummy at 5% significance level (0.221) and with the natural logarithm of total assets at 1 % significance level (0.396). The multiple of brand strength index and industry dummy is positively and statistically significantly correlated with both industry dummy (0.870) and the natural logarithm of total assets (0.340) at 1% significance level. Industry dummy is also positively and statistically significantly correlated with the natural logarithm of total assets at 1% significance level (0.312).

In addition to the correlation already mentioned, the natural logarithm of total assets is also positively and statistically significantly correlated with operating leverage at 5% significance level (0.234) and negatively with personnel costs per fixed assets at 1% significance level (-0.408). Price-to-book ratio is positively and statistically significantly correlated with personnel costs per fixed assets at 5% significance level (0.265). Finally, operating leverage is positively and statistically significantly correlated with financial leverage at 5% significance level (0.272), and negatively with personnel costs per fixed assets at 1% significance level (-0.506).

Spearman's rho

The estimates of Spearman's rank correlation coefficient give similar but also dissenting results. Here, contrary to the estimates of Pearson correlation, average beta and variance of ROA are negatively and statistically significantly correlated with each other at 1% significance level (-0.317). Average beta is also positively statistically significantly correlated with brand strength index at 5% significance level (0.277) and with the natural

logarithm of total assets at 1% significance level (0.633). Variance of ROA is negatively and statistically significantly correlated with brand strength index (-0.288), the natural logarithm of total assets (-545) and with financial leverage (-0.365), all at 1% significance level. In addition to these, variance of ROA is negatively and statistically significantly correlated with operating leverage at 5% significance level (-0.278) and positively with personnel costs per fixed assets at 1% significance level (0.308). Here are few differences to Pearson correlation results, as it can be seen from table 3, under the diagonal variance of ROA does not have statistically significant correlation with brand strength, operating leverage, or personnel costs per fixed assets.

Table 3 shows that brand strength index is positively and statistically significantly correlated with the natural logarithm of total assets at 1% significance level (0.370). The difference here is that the estimates of Pearson correlation showed that brand strength index would also correlate statistically significantly with the multiple of brand strength index and industry dummy. The multiple of brand strength index and industry dummy is positively and almost perfectly correlated with industry dummy at 1% significance level (0.942), and with the natural logarithm of total assets at 5% significance level (0.238). Industry dummy is also positively and statistically significantly correlated with the natural logarithm of total assets at 5% significance level (0.269).

In addition to the correlation already mentioned, the natural logarithm of total assets is also negatively and statistically significantly correlated with personnel costs per fixed assets (-0.434) at 1% significance level. Here the results differ in that Pearson correlation indicated that there would be a statistically significant correlation between the natural logarithm of total assets and operating leverage, but Spearman's rank correlation does not support this. Price-to-book ratio is positively and statistically significantly correlated with personnel costs per fixed assets at 1% significance level (0.320).

Financial leverage is positively and statistically significantly correlated with operating leverage at 1% significance level (0.458) and negatively with personnel costs per fixed assets at 5% significance level (-0.244). Under Pearson correlation there was no statistically significant correlation between financial leverage and personnel costs per fixed assets. Finally, according to Spearman's rank correlation, operating leverage is negatively

and statistically significantly correlated with personnel costs per fixed assets at 1% significance level (-0.698).

Additional tests

Three outliers could be identified based on the values of variance of ROA. These three companies were Biotie Therapies, Pohjola Pankki and QPR Software. The correlation analysis was re-conducted without including these outliers in it to test if the results between Pearson and Spearman correlation would this way be closer to each other, even though no notable differences were detected in the first place.

Excluding the outliers, Biotie Therapies, Pohjola Pankki and QPR Software, caused some differences to the correlation matrix. The most significant differences were that with this sample of companies, both Pearson and Spearman correlation show that there is a negative and statistically significant correlation between average beta and variance of ROA at 5% significance level, (-0.253) from Pearson correlation and (-0.277) from Spearman correlation. In addition, the results of Pearson correlation suggest that variance of ROA is, in addition to the correlation shown in table 3, negatively correlated with brand strength index at 5% significance level (-0.224) and positively with personnel costs per fixed assets at 1% significance level (0.419). In contrast, the estimates of Pearson correlation show that variance of ROA is not statistically significantly correlated with financial leverage unlike in table 3. In addition to these, there were several other differences in the significance levels and between the correlations between the control variables that will not be reported here. The correlation matrix excluding the outliers is presented in Appendix 3.

Two other tests were also conducted: one with all the companies included in the sample and the other with the real sample size but brand strength index converted into a dummy variable. The correlation analysis results remain fairly similar even though it would be conducted with all the 100 top Finnish brands included in the sample. The differences were mainly related to Spearman correlation. When all the companies are included in the analysis it seems that variance of ROA is not statistically significantly correlated with brand strength index as reported in table 3. I will not report here any changes in the correlations between the independent variables, but the table for this correlation matrix is presented in Appendix 6.

As already mentioned when defining the variables in section 6.2.3, SPSS expects all the variables to be continuous what the brand strength index, varying from 10 to 1, is not. This is why I conducted the analysis also by converting the brand strength variable into a dummy variable. The division between the indexes is done so that there would be equally many observations in both groups (0 and 1), and this way 49 observations (indexes from 1 to 4) get value 0 and 61 (indexes from 5 to 10) get value 1. With brand strength as a dummy variable the results are similar to the results showed in table 3 with such minor differences in the numbers that it is not relevant to report them here. The correlation matrix for this analysis is presented in Appendix 9.

7.3 Regression Analysis

The results of the regression analysis demonstrate how much of the variance in the company risk the independent variables (brand strength, industry dummy, natural logarithm of total assets, price-to-book ratio, financial leverage and operating leverage) explain. Regression analysis is conducted separately for both risk measures. The independent variables are added in three blocks into the regression. The first block includes only brand strength; the second block also includes the multiplication of brand strength index and industry dummy as well as industry dummy itself, and the third block all the remaining variables added to these three. The results are presented in the following sections. The regression equations were presented in chapter 6.1.

7.3.1 Beta as the Dependent Variable

The results of the first regression model, with beta as the dependent variable, are presented in table 4. Table values represent estimated coefficients with accompanying P-values. P-values that are significant at 5% significance level or better (two-sided test) are presented in **boldface**.

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.235	**0.031**	0.211	0.065	-2.264	**0.000**
BSind	0.057	**0.008**	0.061	**0.008**	0.003	0.871
BSIndust			-0.024	0.575	-0.034	0.299
Industry			0.176	0.462	0.031	0.864
LnTA					0.145	**0.000**
PB					0.036	**0.054**
FL					0.035	0.344
OL					-0.317	**0.030**
Model F-value (prob)	7.487 (0.008)		2.645 (0.055)		12.468 (0.000)	
Adj. R-square	0.073		0.057		0.507	
Durbin-Watson	2.210		2.178		2.251	
Nobs	83		83		79	

Table 4 provides the regression results with beta as the dependent variable. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; and OL is operating leverage, i.e. the ratio of fixed to variable costs. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

Table 4: Regression results with beta as the dependent variable

The model F-value describes whether the regression model is statistically significant or not. This model's F-value is 12.468 and it is statistically very significant ($p < 0.01$).

R-square is the coefficient of multiple determinations. It describes how big part of the dependent variable is explained by the set of independent variables selected in the regression equation (0.0 or 0% is low and 1.0 or 100% is high). Here adjusted R-square is reported. It is a modification of R-square that adjusts for the number of terms in a model. R-square increases when a new term is added to a model, whereas adjusted R-square increases only if the new term improves the model more than would be expected by

chance. Adjusted R-square is generally considered to be a more accurate goodness-of-fit measure than R-square.

In this regression there is a significant increase in adjusted R-square as more variables are added to the model. When explaining the market risk by only brand strength and industry, the adjusted R-square is very low, close to 0. However, in the third block, when the rest of the variables are added to the model, the adjusted R-square increases to 0.507, which is relatively high and indicates that the chosen variables explain approximately half of market risk as it is determined in this research.

What is interesting from the viewpoint of this thesis is to notice that brand strength has a statistically significant positive impact on market risk, when looking at the first and the second block. The second block takes into consideration the possible effect of industry. These results suggest that in business-to-business industries the risk is higher for companies with stronger brands (coefficient is 0.061 and statistically very significant, P-value 0.008<0.01). The P-values for the multiple of brand strength index and industry dummy and for industry dummy are not statistically significant, and thus nothing can be said about the effect of brand strength on market risk among consumer business firms.

After adding the accounting variables into the model in the third block, brand strength loses its statistical significance. As this is the result, nothing can be said about whether the association between brand strength and market risk would be negative or positive. As can be recalled from the literature review, Bharadwaj et al. (2010) reported in their study that they found brand quality[13] to have a positive impact on firm's systematic risk. Contrary to these results, McAlister et al. (2007) found higher brand equity[14] lowering firm's systematic risk, which is what several other studies have also reported (see e.g. Madden et al., 2006 and Dutordoir et al., 2010). Based on the results here, neither hypothesis 1 (which assumed there is a negative association between brand strength and the riskiness of a firm) nor hypothesis 2 (which assumed that there is a positive association between brand strength and the riskiness of a firm) can be accepted due to the lack of statistical

[13] What Bharadwaj et al. (2010) called brand quality in their research is understood as brand strength in this study.
[14] Brand equity in the study conducted by McAlister et al. (2007) is considered to mean the same as brand strength in this study.

significance. Added to this, based on the regression analysis results also hypothesis 3 should be rejected, since table 4 shows that the association between brand strength and market risk is not dependent on whether the firm is operating in consumer business or business-to-business market. What should be noted is that these results do not prove that there could be no association between brand strength and the riskiness of a company whatsoever. The results only show that with this sample and with these variables there are no statistically reliable proofs for such an assumption.

Of the accounting variables, both the natural logarithm of total assets and operating leverage have statistically significant impact on market risk based on these results. Based on the results it seems that the natural logarithm of total assets has a positive association with market risk, whereas operating leverage has a negative one. The result for operating leverage is contrary to what Lev (1974) reported. He found that as operating leverage increases the market risk also increases, whereas these results suggest that as the operating leverage increases the market risk decreases. The P-value for price-to-book ratio is 0.054 and since it is this close to the 5% significance level it is also highlighted in table 3 and can be said to be statistically significant. Similarly to the natural logarithm of total assets, market risk increases as price-to-book ratio increases. What I found it a little bit unexpected, was that financial leverage does not have a statistically significant effect on market risk, because several previous researches have reported an existing association between these two variables (see e.g. Lev 1974, and Gahlon and Gentry 1986).

Durbin-Watson test, which reports autocorrelation, got a value of 2.251 when all the variables were added into the regression model. This is acceptable, since the value should be on a range of 1.5-2.5. From this number we can see that the variables are independent.

Similarly as with correlation matrices, I conducted three additional regression analyses: one with excluding the outliers (Biotie Therapies, Pohjola Pankki and QPR Software), the other with including all the 100 companies into the analysis, and the third with keeping the sample of 83 companies but converting the brand strength index into a dummy variable. The division between the indexes was done so that 49 observations (indexes from 1 to 4) got value 0 and 61 (indexes from 5 to 10) got value 1. The results remained fairly

unchangeable in all of these additional regressions so it is not relevant to report the results here. The tables are presented in appendices (Appendix 1, Appendix 4 and Appendix 7).

7.3.2 Variance of ROA as the Dependent Variable

The results of the second regression model, with variance of ROA as the dependent variable, are presented in table 5. Table values represent estimated coefficients with accompanying P-values. P-values that are significant at 5% significance level or better (two-sided test) are presented in **boldface**.

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.029	**0.010**	0.030	**0.012**	0.068	**0.003**
BSind	-0.003	0.129	-0.003	0.139	-0.001	0.306
BSIndust			0.001	0.807	0.001	0.750
Industry			-0.007	0.764	0.005	0.638
LnTA					-0.003	**0.000**
PB					0.001	0.219
OL					-0.001	0.951
PF					0.003	0.088
Model F-value (prob)	2.348 (0.129)		0.795 (0.500)		4.227 (0.001)	
Adj. R-square	0.016		-0.008		0.227	
Durbin-Watson	1.852		1.854		1.771	
Nobs	83		83		78	

Table 5 provides the regression results with variance of ROA as the dependent variable. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

Table 5: Regression results with variance of ROA as the dependent variable

The F-value of this regression model, with all the variables added in the analysis, is 4.227 with a probability of 0.001. This indicates that the model is statistically very significant, since the P-value is under 1%.

Adjusted R-square measures the proportion of the variation in the dependent variable accounted for by the explanatory variables. As already brought up, it can go up or down depending on whether the addition of another variable adds or does not add to the explanatory power of the model. When explaining the variance of ROA by only brand strength, the adjusted R-square is 0.016. In the second block, the adjusted R-square decreases to -0.008. This may indicate that in the model the ratio of observations to regressors is too low. When R-square is low, the adjusted R-square will become negative. This result also suggests that there might be some useless regressors in the model.

As the rest of the variables are added to equation, the adjusted R-square increases to 0.227. This is still not very high but already a lot better indicating that adding the natural logarithm of total assets, operating leverage and personnel costs per fixed assets into the model adds the explanatory power of the model. However, it looks like there are still some variables affecting business risk that were not identified here.

The regression analysis results presented in table 5 show that there is no statistically significant association between brand strength and business risk. Neither is this association dependent on whether the firm is operating in consumer business or business-to-business market. Thus, no support for any of the three hypotheses is provided and they should be rejected. In addition, since the results are not statistically significant, nothing can be reliably said whether the association between brand strength and business risk might be negative or positive. The results cannot be really compared to theory, since no prior literature examining the association between brand strength and business could be found. These results show that with the chosen sample and variables there is no statistically reliable evidence that there would be an association between brand strength and the riskiness of a company, and that it would be dependent on firm's main industry (consumer versus business-to-business market). It does not, however, mean that such an association could not exist.

Of the other variables the natural logarithm of total assets has a statistically significant negative impact on business risk. None of the other variables seem to have statistically very significant association with business risk when it is set that the P-value should be under 5%. However, if this margin is raised up to 10% ($p<0.1$), then personnel costs per fixed assets also seem to have statistically significant association with business risk, but positive. This indicates that when personnel costs increase relative to fixed assets, business risk also increases. These results are somewhat in accordance to what Kinnunen et al. (2006) wrote. According to them, the stiffness of the firm's cost structure affects business risk. Personnel costs per fixed assets is the other variable here measuring this stiffness and it seems to have a positive association with business risk, which supports the theory. Contrary to this, the other variable in this equation measuring the stiffness of the cost structure, operating leverage, seems not to have a statistically significant impact on business risk.

Durbin-Watson test got a value of 1.771 with all the variables taken into account. An acceptable value for this ratio would be 1.5-2.5, so the result indicates that all the variables are independent.

Again, three additional regression analyses were conducted: one with excluding the outliers (Biotie Therapies, Pohjola Pankki and QPR Software) in the analysis, the other with including all the 100 companies into the analysis and the third with keeping the sample of 83 companies but converting the brand strength index into a dummy variable (49 of the observations (indexes from 1 to 4) got value 0 and 61 (indexes from 5 to 10) value 1). The results remain fairly similar. When the outliers are excluded from the analysis, in the first two blocks it seems that brand strength has a statistically significant negative association with business risk, but in the third block the results show that this association is not statistically significant. The results of this regression analysis also show that personnel costs per fixed assets is statistically significant at 5% significance level, and here too the association is positive. The table for this regression is presented in Appendix 2.

When all companies are included in the sample, the results remain otherwise practically unchangeable compared to the results presented in table 5, except that personnel costs per

fixed assets is not statistically significant even if the margin would be raised to 10%. The results of the regression analysis with brand strength index converted into a dummy variable give practically the same results as the ones in table 5. Tables for these two regressions are presented in appendices (Appendix 5 and Appendix 8).

7.4 Robustness Tests

7.4.1 Multicollinearity

Table 5 shows the possible multicollinearity. The tolerance value is calculated by 1/VIF, so it is basically indifferent which column to look at. However, tolerance is basically the independent variance associated with the independent variable independent of the other variables, i.e. it tells us the amount of the variance that is not predicted by other independent variables.

Normally, if tolerance is smaller than 0.2 there is a problem with multicollinearity. Based on table 5, it seems that with most of the variables there is no problem with multicollinearity, since all the variables have tolerance level much higher than 0.2. The only variables that have tolerance level close to 0.2 are industry dummy and the multiple of brand strength index and industry dummy. The results remain fairly unchangeable regardless if the dependent variable is average beta or variance of ROA.

Independent Variables	*AvgBeta*		*VarROA*	
	Tolerance	*VIF*	*Tolerance*	*VIF*
BSind	0.738	1.354	0.734	1.361
BSIndust	0.249	4.011	0.251	3.979
Industry	0.253	3.959	0.257	3.894
LnTA	0.767	1.303	0.696	1.437
PB	0.921	1.086	0.875	1.143
FL	0.854	1.171	-	-
OL	0.835	1.198	0.722	1.385
PF	-	-	0.585	1.709

Table 6 provides the multicollinearity between the variables. AvgBeta is the market risk in a company measured by the average of its stock beta during 2008; VarROA is the business risk in a company, measured by the variance of ROA over the period 2002-2011; BSind is the brand strength index on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets.

Table 6: Multicollinearity: tolerance and variance inflation factor

7.4.2 Alternative measures for business risk

In this chapter, two addition regression analyses for testing business risk will be presented. Table 7 shows the result from a regression conducted with a trend cleaned ROA as the dependent variable, and table 8 regression results with the variance of the change in ROA as the dependent variable. The purpose of these additional regressions is to find out, if the results are congruent with the regression analysis presented in chapter 7.3.2 with variance of ROA as the dependent variable.

Table values represent estimated coefficients with accompanying P-values. P-values that are significant at 5% significance level or better (two-sided test) are presented in **boldface**.

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.023	**0.017**	0.024	**0.021**	0.057	**0.002**
BSind	-0.003	0.159	-0.003	0.179	-0.001	0.282
BSIndust			0.001	0.886	0.000	0.874
Industry			-0.004	0.847	0.006	0.491
LnTA					-0.003	**0.007**
PB					0.001	0.276
OL					-0.002	0.784
PF					0.002	0.241
Model F-value (prob)	2.017 (0.159)		0.669 (0.573)		3.712 (0.002)	
Adj. R-square	0.012		-0.012		0.198	
Durbin-Watson	1.906		1.908		1.727	
Nobs	83		83		78	

Table 7 provides the regression results with trend clean ROA as the dependent variable. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

Table 7: Regression results with trend cleaned ROA as the dependent variable

As defined in chapter 6.2.1, the trend cleaned return on assets reflects the part of the risk measure that is not explained by the linear trend. From table 6, it can be seen that when only brand strength is included in the regression the F-value for the model is 2.017 with a probability of 0.159, but as more variables are added to equation the probability of the F-value first increases, but in the third block finally decreases into 0.002, which is statistically very significant ($p<0.01$). This is very close to the results from a model with variance of ROA as the dependent variable and similarly the conclusion is that the model is statistically significant.

The adjusted R-square is 0.198, which is slightly smaller than with variance of ROA as the dependent variable. Adding the natural logarithm of total assets, operating leverage and personnel costs per fixed assets into the regression analysis adds the explanatory power of the model, but in order to raise the explanatory power of the model even higher more relevant variables should be still identified and added to the model.

Based on the results of the regression analysis, brand strength has no statistically significant association with business risk and thus it cannot be interpreted whether this association might be negative or positive if it existed. Neither is this association dependent on whether the firm operates in consumer business or business-to-business market, based on these results. Thus, all the three hypotheses set in this research should be rejected.

Of the independent variables only the natural logarithm of total assets seems to have statistically significant impact on business risk measure as trend cleaned ROA (P value = 0.007). Here the results conflict with theory. Kinnunen et al. (2006) brought up that the stiffness of the firm's cost structure affects business risk, but these results show the opposite. This kind of conclusion does not, however, prove that no such association exists but with this sample and with these variables there is no statistically reliable support for the matter. The Durbin-Watson test got a value of 1.727 with all the variables taken into account, indicating that all the variables are independent.

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.036	**0.001**	0.037	**0.001**	0.055	0.060
BSind	-0.004	**0.035**	-0.004	**0.047**	0.000	0.750
BSIndust			0.001	0.884	0.000	0.902
Industry			-0.006	0.790	0.011	0.415
LnTA					-0.003	**0.046**
PB					0.000	0.772
OL					0.010	0.425
PF					0.015	**0.000**
Model F-value (prob)	4.582 (0.035)		1.527 (0.214)		10.446 (0.000)	
Adj. R-square	0.042		0.019		0.462	
Durbin-Watson	1.798		1.798		1.365	
Nobs	83		83		78	

Table 8 provides the regression results with variance of change in ROA as the dependent variable. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

Table 8: Regression results with variance of change in ROA as the dependent variable

Table 7 shows the result from a regression conducted with the variance of change in ROA as the dependent variable. The probability of the F-value (0.000) indicates that the model is statistically very significant ($p<0.01$).

Adjusted R-square of this regression analysis is 0.462, which is notably higher than for the regression analyses with variance of ROA or trend clean ROA as the dependent variable.

In the first two blocks brand strength seems to have statistically significant negative association with business risk, but as the rest of the variables are added in the equation, this

association turns out not to be statistically significant. Moreover, the results suggest that the association between brand strength and business risk is not dependent on whether the firm is operating in consumer business or business-to-business market. Thus, no support for none of the three hypotheses set in this research is found and they should all be rejected.

Regression results show that of the other independent variables the natural logarithm of total assets has a statistically significant negative association and personnel costs per fixed assets have a statistically very significant positive association with business risk. As it was with the regression analysis with variance of ROA as the dependent variable in chapter 7.3.2, here the results partially support the theory and partially collide with it. In order for these results to fully support the presented theory, also operating leverage should have had a statistically significant association with business risk, as it was stated by Kinnunen et al. (2006) that operating leverage is one way to measure the stiffness of the firm's cost structure, which affects business risk.

The Durbin-Watson test got a value of 1.365 with all the variables taken into account. As the acceptable value for this ratio would be 1.5-2.5, the test value here indicates that all of the variables might not be independent.

8. CONCLUSIONS

8.1 Summary of the Main Results

This research has a clear contribution to existing literature as to date the association between brand strength and the riskiness of a company has not been extensively studied. There are more studies done related to the relationship between a firm's accounting characteristics and its systematic risk. During the research process it also became apparent that the amount of research related to business risk is surprisingly narrow. However, firms are beginning to acknowledge the importance of their intangible assets and at the same time the potential benefits of brand related factors, such as brand strength. Several studies have reported an existing link between brand strength and shareholder value and, in addition to this, a link between brand strength and the riskiness of a firm. The topic was very intriguing to explore, in addition to which it is of great interest for firms and investors also from practical viewpoint, since the riskiness of a firm affects the firm value. What is more, the topic is relevant in the current economic situation. On top of this all, this is the first study related to the topic conducted using Finnish data.

The main hypothesis of the research was that there is negative association between brand strength and the riskiness of a company, i.e. stronger brands should decrease the firm's risk level. The second hypothesis was that, opposite to the first hypothesis, there is a positive association between brand strength and the riskiness of a company, i.e. stronger brands increase the firm's risk level. The third hypothesis aimed at examining whether the association between brand strength and the riskiness of a company is dependent on whether the firm operates in consumer business or business-to-business market.

Most of the prior researches supported the first hypothesis. Brand strength has been recognized by several studies as delivering greater returns to stockholders that relevant benchmark with lower risk (see e.g. Dutordoir et al. 2010; McAlister et al., 2007; and Madden et al., 2006). It has also been shown that strong brand names result in a greater customer loyalty, smaller vulnerability to competitors, larger margins, and more inelastic responses to price increases. However, there were also findings from one study (Bharadwaj et al., 2010) that companies with stronger brands were hurt more during the recent

recession. This was the alleged outcome if stronger brands mean higher prices, because during downturns consumers become more price conscious.

When talking about the industry viewpoint, studies have shown that in consumer business brand indeed does matter, but the business-to-business side is not as widely explored. There are, however, results that brands also matter in business-to-business markets (see e.g. Mudambi, 2001; and Gordon et al., 1993) and that firms operating in these markets have become more aware of it. In this thesis, it was still assumed that brand strength has a bigger impact in consumer business than in business-to-business market.

The study was conducted as a statistical analysis by using SPSS and the methods used were descriptive statistics, correlation analysis, and multiple linear regression analysis as the main research method. Total risk was divided into market risk (measured by beta) and business risk (measured by variance of ROA), which formed the two dependent variables. Brand strength was the test variable and other independent variables (natural logarithm of total assets, price-to-book, financial leverage, operating leverage and personnel costs per fixed assets) were chosen based on hypotheses and prior literature.

The regression analysis was conducted separately for both risk measures and the independent variables were added in the analysis in three blocks. For market risk, when only the impact of brand strength was tested, a statistically significant positive association was found. However, as the rest of the variables were added into the analysis, the association was found not to be statistically significant. Neither provided the results any evidence on the assumption that the association between brand strength and the riskiness of a company would be dependent on whether the firm is operating in consumer business or business-to-business market. Thus, no support for any of the presented hypotheses was found. The model as a whole, then again, was statistically very significant and the chosen variables explained half of the dependent variable.

For business risk the results were very similar. No statistically significant association between brand strength and the risk was found, added to which no support was found that the association between brand strength and the riskiness of a company would depend on the company's main industry (consumer business versus business-to-business). After

adding all the variables into the equation, the model as a whole was, however, statistically very significant. What it comes to the statistically significance of the chosen control variables, the results partially supported the theory but also were somewhat contradictory. Two robustness tests were also conducted, by measuring business risk with a trend cleaned return on assets and with the variance of change in return on assets. Regression analysis with a trend cleaned ROA gave fairly similar results as the main analysis, whereas the analysis conducted with the variance of change in ROA as the dependent variable gave somewhat differing results in that that the explanatory power of the independent variables seemed to be notably higher than in two other regression analyses.

As a conclusion, no support for the research hypotheses was found. Based on prior literature and the results from related researches, it could have been assumed that the regression analysis results in this study would have more supported the presented research hypotheses. However, it should be noted is that these results do not prove that there could be no association between brand strength and the riskiness of a company whatsoever. Nor do these results prove that this association could be dependent on the firm's main industry (consumer business versus business-to-business). The results only show that with this sample and with these variables there is no statistically reliable evidence on such assumptions. There are few limitations related to this study, which will be discussed next.

8.2 Limitations of the Study

There are a few limitations to this study that should be noted when analyzing the results. First, the sample size is not very big. The number of sample companies is not remarkably small, but with a bigger sample size the results could be more statistically significant.

Second, the sample only consists of Finnish listed companies, or to be exact of 100 most valuable Finnish brands in 2007, ranked by BrandFinance in cooperation BrandWorxx. The fact that this is the first study conducted with Finnish data is one of its strengths and part of the contribution, but it can also be seen as a limitation, at least to some extent. Even though many of these firms operate globally, there might be some country related factors affecting the results. It is widely acknowledged that organizational cultures differ, in some

cases even from country to country to some extent, and more so between countries that are also otherwise culturally different. Moreover, social and cultural aspects affect consumption choices of individual people. Thus, extending the research into more countries than just one, and even beyond continents and cultures, might produce more widely applicable results. Another option might be to simply compare the results from different countries or groups of countries together.

There is also a third limitation related to the sample choice. One of the independent variables in the regression models was industry with a purpose of finding out if the association between brand strength and the riskiness of a company is dependent on whether the firm operates in consumer business or business-to-business market. This sample consists for the large part of firms operating in a business-to-business sector, and only a small minority could be identified as consumer business firms. Thus, this thesis might not provide a sufficient answer to this research question and it should be tested with a sample consisting of firms equally representing business-to-business and consumer business sectors.

The other limitations are related to the specific regression model constructed for this research. As already mentioned, the main regressions were conducting with using a brand strength index. SPSS, which was used to conduct the regressions, expects all the variables to be continuous, what an index valuation is not. This may have had some sort of an effect on the results, but it is not likely that the effect has been very notable.

Furthermore, the study period was nine years and observations to calculate the variance of ROA were gathered between 2002 and 2011, and the brand strength ranking was done in 2007. To test for the real causality it would have been good to have a longer time period after the brand rating, but now there were only four years. With market risk (measured by beta) this was not a problem, because it could be calculated on a monthly basis, but for business risk (measured by the variance of ROA) a longer time period would have been necessary. Here, in order to get enough observation to calculate the variance, the time period had to be prolonged backwards, down until 2002.

8.3 Implications for Further Research

Implications for further research derive more or less from the limitations related to this study. First, as it was noted, the sample consists for the large part of firms operating in a business-to-business sector, whereas only few were identified as consumer business firms. Thus, a research of the same topic as here could be conducted but with a sample that consists evenly of both business-to-business and consumer business firms, in order to provide more reliable results on whether or not the association between brand strength and the riskiness of a firm is dependent on the firm's main industry (consumer business versus business-to-business).

Second, the association between brand strength and the riskiness of a company could be explored by extending the research to several countries, also to get a bigger sample size. Bigger sample size would provide more widely applicable results and extending the research to other countries would give information on whether or not the brand strength has a stronger impact on the riskiness of a firm in other countries and cultures than in others.

When using the variance of ROA as a measure for business risk, it might be relevant to redo the research when there is a longer time period after valuing brand strength, in order to more reliably testing for the causality. This of course sets a challenge for the sample size, especially if it is relative small already in the first place, because as the time period lengthens more companies might cease their operations due to e.g. acquisitions or bankruptcy.

Still the topic is relatively narrowly studied. The outcomes of the research could be of great interest for firms and investors from practical viewpoint, since the riskiness of a firm affects the firm value. Added to this, in this current economic situation there is lots of uncertainty in the market and companies are fighting to retain their customers, make profits for their shareholders and provide jobs for people. All this makes the subject topical and socially important.

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10. APPENDICES

10.1 Appendix 1: Regression Results Excluding the Outliers (Beta as the Dependent Variable)

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.260	**0.021**	0.237	**0.046**	-2.247	**0.000**
BSind	0.053	**0.016**	0.057	**0.016**	0.002	0.896
BSIndust			-0.024	0.582	-0.033	0.307
Industry			0.156	0.520	0.029	0.872
LnTA					0.145	**0.000**
PB					0.036	**0.054**
FL					0.035	0.353
OL					-0.318	**0.031**
Model F-value (prob)	6.015 (0.016)		2.104 (0.107)		11.817 (0.000)	
Adj. R-square	0.060		0.040		0.496	
Durbin-Watson	2.124		2.099		2.165	
Nobs	80		80		78	

Appendix 1 provides the regression results with beta as the dependent variable, outliers excluded from the analysis. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; and OL is operating leverage, i.e. the ratio of fixed to variable costs. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

10.2 Appendix 2: Regression Results Excluding the Outliers (Variance of ROA as the Dependent Variable)

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.014	**0.000**	0.014	**0.000**	0.043	**0.002**
BSind	-0.001	**0.046**	-0.001	**0.047**	0.000	0.567
BSIndust			0.000	0.806	0.000	0.846
Industry			0.002	0.731	0.007	0.271
LnTA					-0.002	**0.005**
PB					0.000	0.494
OL					0.002	0.741
PF					0.003	**0.021**
Model F-value (prob)	4.116 (0.046)		1.813 (0.152)		4.663 (0.000)	
Adj. R-square	0.038		0.030		0.252	
Durbin-Watson	2.024		2.057		2.119	
Nobs	80		80		77	

Appendix 2 provides the regression results with variance of ROA as the dependent variable, outliers excluded from the analysis. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

10.3 Appendix 3: Correlation Matrix of the Variables Excluding the Outliers

	AvgBeta	*VarROA*	*BSind*	*BSIndust*	*Industry*	*LnTA*	*PB*	*FL*	*OL*	*PF*
AvgBeta		**-0.277***	**0.249***	0.054	0.070	**0.616****	**0.252***	0.033	-0.070	-0.082
		0.013	0.026	0.637	0.538	0.000	0.025	0.773	0.539	0.479
VarROA	**-0.253***		**-0.251***	-0.003	0.034	**-0.497****	0.045	**-0.333****	**-0.267***	**0.323****
	0.024		0.025	0.981	0.766	0.000	0.694	0.003	0.017	0.004
BSind	**0.268***	**-0.224***		0.053	-0.003	**0.339****	0.139	-0.020	-0.018	-0.170
	0.016	0.046		0.638	0.978	0.002	0.222	0.858	0.873	0.140
BSIndust	0.057	0.075	0.204		**0.938****	0.187	-0.030	-0.060	0.095	-0.088
	0.619	0.508	0.070		0.000	0.097	0.796	0.598	0.403	0.446
Industry	0.046	0.118	0.034	**0.859****		**0.224***	0.022	-0.098	0.100	-0.099
	0.686	0.295	0.765	0.000		0.046	0.844	0.386	0.380	0.391
LnTA	**0.678****	**-0.436****	**0.366****	**0.285***	**0.257***		0.034	0.143	0.202	**-0.448****
	0.000	0.000	0.001	0.010	0.021		0.769	0.207	0.074	0.000
PB	**0.224***	0.102	0.148	0.048	0.004	0.065		-0.177	-0.095	**0.297****
	0.047	0.373	0.193	0.676	0.974	0.568		0.120	0.408	0.009
FL	-0.025	0.043	-0.167	-0.086	-0.097	-0.035	-0.208		**0.461****	**-0.268***
	0.828	0.705	0.138	0.449	0.392	0.758	0.066		0.000	0.018
OL	-0.045	-0.205	-0.031	0.025	0.070	0.217	-0.167	**0.289****		**-0.697****
	0.693	0.069	0.783	0.826	0.537	0.055	0.145	0.010		0.000
PF	-0.044	**0.419****	-0.181	-0.086	-0.095	**-0.392****	**0.245***	-0.171	**-0.494****	
	0.706	0.000	0.114	0.455	0.410	0.000	0.032	0.137	0.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 3 provides the correlation matrix of the variables, outliers excluded from the analysis. AvgBeta is the market risk in a company measured by the average of its stock beta during 2008; VarROA is the business risk in a company, measured by the variance of ROA over the period 2002-2011; BSind is the brand strength index on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets.

10.4 Appendix 4: Regression Results with all Companies Included in the Analysis (Beta as the Dependent Variable)

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.194	**0.039**	0.170	0.084	-2.179	**0.000**
BSind	0.063	**0.001**	0.068	**0.001**	0.004	0.795
BSIndust			-0.035	0.380	-0.033	0.276
Industry			0.178	0.426	0.017	0.919
LnTA					0.141	**0.000**
PB					0.038	**0.021**
FL					0.019	0.483
OL					-0.331	**0.011**
Model F-value (prob)	11.688 (0.001)		4.107 (0.009)		14.841 (0.000)	
Adj. R-square	0.097		0.086		0.505	
Durbin-Watson	2.040		2.017		2.260	
Nobs	100		100		96	

Appendix 4 provides the regression results with beta as the dependent variable with all companies are included in the sample. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; and OL is operating leverage, i.e. the ratio of fixed to variable costs. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

10.5 Appendix 5: Regression Results with all Companies Included in the Analysis (Variance of ROA as the Dependent Variable)

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.024	**0.009**	0.024	**0.011**	0.069	**0.000**
BSind	-0.003	0.145	-0.003	0.158	-0.001	0.295
BSIndust			0.001	0.840	0.000	0.950
Industry			-0.006	0.798	0.005	0.625
LnTA					-0.003	**0.004**
PB					0.001	0.168
OL					-0.005	0.585
PF					0.001	0.553
Model F-value (prob)	2.157 (0.145)		0.728 (0.538)		3.245 (0.004)	
Adj. R-square	0.012		-0.008		0.145	
Durbin-Watson	1.840		1.844		1.802	
Nobs	100		100		94	

Appendix 5 provides the regression results with variance ROA as the dependent variable with all companies are included in the sample. Intercept is the constant included in the regression; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

10.6 Appendix 6: Correlation Matrix of the Variables with all Companies Included in the Analysis

	AvgBeta	*VarROA*	*BSind*	*BSIndust*	*Industry*	*LnTA*	*FL*	*OL*	*PF*	*SE*	*PB*
AvgBeta		**-0.240***	**0.287****	0.031	0.043	**0.618****	0.002	-0.122	-0.041	**0.342****	0.163
		0.016	0.004	0.759	0.671	0.000	0.984	0.230	0.696	0.001	0.109
VarROA	-0.157		-0.194	-0.080	-0.055	**-0.504****	**-0.287****	**-0.199***	**0.296****	**-0.250***	0.126
	0.118		0.053	0.431	0.587	0.000	0.004	0.049	0.004	0.014	0.215
BSind	**0.326****	-0.147		0.112	0.063	**0.387****	-0.023	-0.027	-0.130	0.191	0.154
	0.001	0.145		0.269	0.534	0.000	0.821	0.793	0.208	0.060	0.131
BSIndust	0.038	-0.039	**0.223***		**0.951****	0.186	-0.003	0.110	-0.067	0.021	-0.021
	0.707	0.703	0.026		0.000	0.065	0.976	0.280	0.517	0.841	0.837
Industry	0.029	-0.029	0.079	**0.884****		**0.216***	-0.025	0.118	-0.083	0.000	0.014
	0.776	0.777	0.434	0.000		0.031	0.805	0.248	0.423	1.000	0.888
LnTA	**0.665****	**-0.293****	**0.418****	**0.283****	**0.267****		0.167	0.172	**-0.415****	**0.486****	-0.023
	0.000	0.003	0.000	0.004	0.007		0.096	0.091	0.000	0.000	0.824
FL	-0.057	**-0.242***	-0.129	0.046	0.094	0.026		**0.534****	**-0.315****	-0.123	**-0.205***
	0.574	0.015	0.202	0.651	0.354	0.799		0.000	0.002	0.228	0.043
OL	-0.087	-0.067	-0.038	0.048	0.110	**0.201***	**0.364****		**-0.700****	-0.101	-0.135
	0.395	0.512	0.711	0.640	0.282	0.047	0.000		0.000	0.325	0.189
PF	0.042	0.079	-0.165	-0.062	-0.073	**-0.323****	-0.138	**-0.437****		**-0.380****	**0.330****
	0.683	0.448	0.110	0.549	0.480	0.001	0.184	0.000		0.000	0.001
SE	0.105	-0.049	0.114	0.008	0.023	**0.330****	-0.110	0.033	-0.142		-0.055
	0.304	0.634	0.267	0.937	0.820	0.001	0.286	0.746	0.170		0.592
PB	0.198	0.143	0.179	0.046	-0.002	-0.009	**-0.214***	-0.192	0.162	-0.082	
	0.051	0.162	0.077	0.655	0.986	0.930	0.034	0.061	0.118	0.427	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 6 provides the correlation matrix of the variables with all companies included in the sample. AvgBeta is the market risk in a company measured by the average of its stock beta during 2008; VarROA is the business risk in a company, measured by the variance of its ROA over the period 2002-2011; BSind is the brand strength index number on a scale from 1-10 converted from brand ratings on a scale from AAA to D; BSIndust is the multiple of the brand strength index and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs calculated as fixed assets divided by total assets; PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets; SE is sales per employees ratio; and PB is the price-to-book ratio comparing a company's current market value to its book value.

10.7 Appendix 7: Regression Results with Brand Strength as a Dummy Variable (Beta as the Dependent Variable)

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.391	**0.000**	0.381	**0.000**	-2.221	**0.000**
BSind	0.226	**0.005**	0.233	**0.006**	0.050	0.422
BSIndust			-0.017	0.692	-0.037	0.235
Industry			0.137	0.557	0.053	0.762
LnTA					0.142	**0.000**
PB					0.035	**0.059**
FL					0.037	0.316
OL					-0.310	**0.033**
Model F-value (prob)	8.392 (0.005)		2.878 (0.041)		12.650 (0.000)	
Adj. R-square	0.083		0.064		0.511	
Durbin-Watson	2.152		2.110		2.241	
Nobs	83		83		79	

Appendix 7 provides the regression results with beta as the dependent variable, brand strength being a dummy variable. Intercept is the constant included in the regression; BSdummy is the brand strength index converted into a dummy variable (1-4=0 and 5-10=1); BSIndust is the multiple of the brand strength dummy and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; and OL is operating leverage, i.e. the ratio of fixed to variable costs. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

10.8 Appendix 8: Regression Results with Brand Strength as a Dummy Variable (Variance of ROA as the Dependent Variable)

Independent Variables	*Coef.*	*P-value*	*Coef.*	*P-value*	*Coef.*	*P-value*
(Intercept)	0.020	**0.000**	0.021	**0.001**	0.067	**0.004**
BSdummy	-0.014	0.071	-0.015	0.079	-0.003	0.482
BSIndust			0.001	0.833	0.000	0.873
Industry			-0.006	0.794	0.007	0.530
LnTA					-0.003	**0.005**
PB					0.001	0.234
OL					0.000	0.990
PF					0.003	0.078
Model F-value (prob)	3.337 (0.071)		1.109 (0.351)		4.114 (0.001)	
Adj. R-square	0.028		0.004		0.221	
Durbin-Watson	1.820		1.819		1.782	
Nobs	83		83		78	

Appendix 8 provides the regression results with variance ROA as the dependent variable, brand strength being a dummy variable. Intercept is the constant included in the regression; BSdummy is the brand strength index converted into a dummy variable (1-4=0 and 5-10=1); BSIndust is the multiple of the brand strength dummy and industry dummy (B2B companies = 0 and consumer business companies = 1); Industry is the dummy variable (B2B companies = 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; PB is the price-to-book ratio comparing a company's current market value to its book value; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs; and PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets. P-values that are significant at 5% significance level or better (two-sided test) are presented in boldface.

10.9 Appendix 9: Correlation Matrix of the Variables with Brand Strength as a Dummy Variable

	AvgBeta	*VarROA*	*BSdummy*	*BSIndust*	*Industry*	*LnTA*	*FL*	*OL*	*PF*	*SE*	*PB*
AvgBeta		**-0.317****	**0.313****	0.091	0.104	**0.633****	0.062	-0.052	-0.098	**0.324****	0.207
		0.003	0.004	0.414	0.348	0.000	0.578	0.644	0.389	0.003	0.063
VarROA	-0.184		**-0.280***	-0.072	-0.036	**-0.545****	**-0.365****	**-0.278***	**0.308****	**-0.259***	0.085
	0.097		0.010	0.515	0.748	0.000	0.001	0.012	0.006	0.020	0.449
BSdummy	**0.306****	-0.199		0.126	0.064	**0.329****	0.035	-0.050	-0.124	0.142	0.138
	0.005	0.071		0.258	0.568	0.002	0.752	0.660	0.275	0.210	0.218
BSIndust	0.084	-0.042	0.189		**0.942****	**0.238***	-0.041	0.100	-0.086	0.067	-0.053
	0.453	0.708	0.087		0.000	0.030	0.713	0.377	0.450	0.558	0.638
Industry	0.073	-0.030	0.064	**0.870****		**0.269***	-0.077	0.103	-0.097	0.047	-0.003
	0.514	0.787	0.568	0.000		0.014	0.488	0.361	0.396	0.676	0.979
LnTA	**0.683****	**-0.320****	**0.353****	**0.340****	**0.312****		0.184	0.217	**-0.434****	**0.514****	-0.009
	0.000	0.003	0.001	0.002	0.004		0.096	0.052	0.000	0.000	0.937
FL	0.003	**-0.300****	-0.075	-0.065	-0.075	0.018		**0.458****	**-0.244***	-0.077	-0.190
	0.977	0.006	0.501	0.560	0.503	0.870		0.000	0.030	0.496	0.088
OL	-0.027	-0.096	-0.040	0.029	0.074	**0.234***	**0.272***		**-0.698****	0.003	-0.119
	0.814	0.393	0.724	0.795	0.509	0.035	0.014		0.000	0.979	0.298
PF	-0.069	0.142	-0.167	-0.090	-0.099	**-0.408****	-0.146	**-0.506****		**-0.489****	**0.320****
	0.544	0.212	0.141	0.430	0.386	0.000	0.198	0.000		0.000	0.004
SE	0.083	-0.053	0.034	0.027	0.047	**0.319****	-0.093	0.091	-0.203		-0.102
	0.465	0.642	0.763	0.815	0.681	0.004	0.412	0.422	0.072		0.371
PB	0.194	0.169	0.111	0.019	-0.021	0.015	-0.212	-0.180	**0.265***	-0.092	
	0.083	0.132	0.322	0.864	0.853	0.896	0.057	0.112	0.019	0.420	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 9 provides the correlation matrix of the variables with brand strength as a dummy variable. AvgBeta is the market risk in a company measured by the average of its stock beta during 2008; VarROA is the business risk in a company, measured by the variance of its ROA over the period 2002-2011; BSdummy is the brand strength index converted into a dummy variable (1-4=0 and 5-10=1); BSIndust is the multiple of the brand strength dummy and industry dummy (B2B companie s= 0 and consumer business companies = 1); Industry is the dummy variable (B2B companie s= 0 and consumer business companies = 1); LnTA is the natural logarithm of total assets; FL is financial leverage, i.e. debt to equity ratio; OL is operating leverage, i.e. the ratio of fixed to variable costs calculated as fixed assets divided by total assets; PF is is a ratio measuring the stiffness of the cost structure in a company, calculated as personnel costs divided by fixed assets; SE is sales per employees ratio; and PB is the price-to-book ratio comparing a company's current market value to its book value.

10.10 Appendix 10: Top 100 Finnish Brands 2007

	Company	*Industry*	*Enterprise Value (EUR million)*	*Brand Value (EUR million)*	*Brand Rating*
1	Nokia	Telecommunications	79,936.6	24,407.0	AAA-
2	Fortum	Electric	52,269.3	1,422.9	A+
3	Upm-Kymmene	Forest Products&Paper	14,586.8	1,339.5	AA-
4	Sampo	Insurance	13,874.8	946.1	AA-
5	Kone	Koneenrakennus	8,687.5	528.0	A+
6	Neste Oil	Oil&Gas	8,501.7	1,149.2	AA
7	Outokumpu	Iron/Steel	8,009.7	458.6	BBB
8	Metso	Koneenrakennus	7,586.2	728.5	A+
9	Nasdaq Omx Group	Diversified Finan Serv	6,111.0	742.2	AA-
10	Wärtsilä	Miscellaneous Manufactur	6,070.4	715.5	A+
11	Kesko	Food	5,461.9	1,789.0	BB
12	Nokian Renkaat	Auto Parts&Equipment	5,214.7	159.9	AA+
13	Sanomawsoy	Media	4,914.2	1,054.7	A+
14	Elisa	Telecommunications	4,401.0	290.9	A-
15	Yit	Engineering&Construction	3,888.3	569.5	AA-
16	Stockmann	Retail	3,446.9	383.9	A
17	Pohjola Pankki	Banks	3,307.0	168.0	A+
18	Kemira	Chemicals	3,066.6	615.9	A+
19	Citycon	Real Estate	2,846.0	19.9	A-
20	Orion	Pharmaceuticals	2,641.2	176.3	A+
21	Cargotec	Transportation	2,636.1	833.8	A+
22	Ramirent	Commercial Services	2,330.3	146.3	A+
23	Konecranes	Hand/Machine Tools	2,189.7	514.8	A
24	Amer Sports	Apparel	2,083.0	992.5	AA
25	Ahlstrom	Miscellaneous Manufactur	1,885.1	222.4	BBB
26	Outotec	Machinery-Constr&Mining	1,884.2	141.2	AA
27	Tieto	Computers	1,604.5	474.3	A+
28	Lemminkainen	Engineering&Construction	1,507.5	235.9	BBB
29	Alma Media	Media	1,241.5	100.6	A-
30	Cramo	Commercial Services	1,223.6	103.6	A-
31	Uponor	Miscellaneous Manufactur	1,183.7	101.9	B
32	Finnair	Airlines	1,173.4	394.9	A+
33	Atria Plc	Food	1,086.2	346.2	A+
34	Lassila & Tikanoja	Environmental Control	1,045.5	117.7	AA-
35	Vaisala	Electronics	610.3	45.2	A+
36	Vacon	Hand/Machine Tools	595.7	87.3	A+
37	Ponsse	Koneenrakennus	545.4	38.9	A+
38	Technopolis	Real Estate	533.4	16.1	AA-
39	Oriola-Kd	Pharmaceuticals	499.1	177.4	A-
40	Componenta	Koneenrakennus	498.3	62.4	BBB
41	Olvi	Beverages	465.5	279.4	AA-
42	Tamfelt	Textiles	429.2	68.0	A-
43	Glaston	Miscellaneous Manufactur	396.5	37.2	A-
44	Raisio	Food	387.3	109.5	A+
45	Rapala Vmc	Apparel	380.4	163.3	AA+
46	Srv Group	Engineering&Construction	336.7	54.6	BB
47	Keskisuomalainen	Media	332.2	39.0	A+
48	Suomen Terveystalo	Healthcare-Services	284.5	48.1	A-
49	Salcomp	Electrical Compo&Equip	255.9	54.5	A+
50	Tekla	Software	255.7	20.5	A

51	Pkc Group	Telecommunications	235.3	59.3	BB
52	Aspo	Miscellaneous Manufactur	227.3	42.6	BB
53	Ilkka-Yhtymä	Media	223.7	18.9	A+
54	Larox	Miscellaneous Manufactur	215.6	23.7	A-
55	Suominen	Healthcare-Products	192.5	69.2	A
56	Comptel	Software	191.6	32.3	A+
57	Lännen Tehtaat	Food	186.4	70.4	A-
58	Talentum	Media	186.3	30.3	BBB
59	Affecto	Computers	182.1	32.6	A-
60	Teleste	Telecommunications	179.2	21.4	BB
61	Marimekko	Textiles	174.4	58.4	AA-
62	Elektrobit	Telecommunications	171.9	41.9	A-
63	Nordic Aluminium	Metal Fabricate/Hardware	171.8	28.5	A
64	Etteplan	Koneenrakennus	166.7	12.0	B
65	Digia	Computers	149.5	27.9	A-
66	Nurminen Logistics	Transportation	133.3	1.4	BB
67	Scanfil	Electronics	123.0	31.8	BBB
68	Tiimari	Retail	122.7	15.0	A
69	Rocla	Koneenrakennus	118.8	12.9	A-
70	Saga Furs Oyj	Distribution/Wholesale	112.9	6.1	AA-
71	Basware	Internet	112.2	44.5	A-
72	Tulikivi	Household Products/Wares	110.7	16.1	A
73	Julius Tallberg	Real Estate	105.2	1.5	BB
74	Biotie Therapies	Pharmaceuticals	97.8	3.5	A-
75	Aldata Solution	Software	95.0	21.7	BBB
76	Trainers' House	Commercial Services	87.1	7.7	A
77	Kesla	Koneenrakennus	70.1	6.5	A+
78	Norvestia	Investment Companies	64.0	4.4	A-
79	Tecnotree	Telecommunications	63.0	13.8	BBB
80	Interavanti	Real Estate	61.5	0.6	BBB
81	Efore	Hand/Machine Tools	59.2	20.1	BBB
82	Ixonos	Software	56.3	20.2	BBB
83	Stromsdal	Forest Products&Paper	54.6	5.3	BB
84	Aspocomp Group	Semiconductors	52.8	3.1	BB
85	Elecster	Koneenrakennus	52.7	4.2	A
86	Martela	Office Furnishings	51.6	29.9	AA-
87	Raute	Koneenrakennus	48.9	9.2	BBB
88	Incap	Computers	46.3	14.7	BB
89	Okmetic	Semiconductors	43.7	17.1	A+
90	Biohit	Healthcare-Products	36.7	10.2	BBB
91	Wulff-Group	Household Products/Wares	34.2	18.3	A-
92	Oral Hammaslääkärit	Healthcare-Services	33.0	3.1	A-
93	Honkarakenne	Home Builders	32.7	32.2	A+
94	Tectia Oyj	Computers	24.8	2.5	BBB
95	Turvatiimi	Electronics	14.6	4.1	BBB
96	Qpr Software	Software	14.1	1.8	BB
97	Soprano	Advertising	12.1	0.4	A-
98	Stonesoft	Computers	11.2	4.6	BBB
99	Yleiselektroniikka	Electronics	9.6	4.9	A-
100	Evia	Advertising	5.9	1.0	BBB

10.11 Appendix 11: Division of Companies Into Consumer Business and Business-to-Business Market

	Name	*Industry*	*Basis for Division*
1	Affecto	B-2-B	Annual report
2	Ahlstrom	B-2-B	Annual report
3	Aldata Solution	B-2-B	Subjective Judgment
4	Alma Media	B-2-B	Subjective Judgment
5	Amer Sports	B-2-B	Subjective Judgment
6	Aspo	B-2-B	Annual report
7	Aspocomp Group	B-2-B	Annual report
8	Atria Plc	B-2-B	Annual report
9	Basware	B-2-B	Annual report
10	Biohit	B-2-B	Annual report
11	Biotie Therapies	B-2-B	Subjective Judgment
12	Cargotec	B-2-B	Annual report
13	Citycon	B-2-B	Annual report
14	Componenta	B-2-B	Annual report
15	Comptel	B-2-B	Annual report
16	Cramo	B-2-B	Subjective Judgment
17	Digia	B-2-B	Homepage
18	Efore	B-2-B	Annual report
19	Elecster	B-2-B	Annual report
20	Elektrobit	B-2-B	Annual report
21	Elisa	Consumer	Subjective Judgment
22	Etteplan	B-2-B	Annual report
23	Evia	B-2-B	Subjective Judgment
24	Finnair	Consumer	Subjective Judgment
25	Fortum	B-2-B	Annual report
26	Glaston	B-2-B	Annual report
27	Honkarakenne	B-2-B	Annual report
28	Ilkka-Yhtymä	B-2-B	Subjective Judgment
29	Incap	B-2-B	Annual report
30	Interavanti	B-2-B	Subjective Judgment
31	Ixonos	B-2-B	Annual report
32	Julius Tallberg	B-2-B	Annual report
33	Kemira	B-2-B	Subjective Judgment
34	Keskisuomalainen	B-2-B	Annual report
35	Kesko	Consumer	Subjective Judgment
36	Kesla	B-2-B	Annual report
37	Kone	B-2-B	Annual report
38	Konecranes	B-2-B	Annual report
39	Lännen Tehtaat	B-2-B	Annual report
40	Larox	B-2-B	Annual report
41	Lassila & Tikanoja	B-2-B	Annual report
42	Lemminkainen	B-2-B	Annual report
43	Marimekko	Consumer	Annual report
44	Martela	B-2-B	Annual report
45	Metso	B-2-B	Annual report
46	Nasdaq Omx Group	B-2-B	Annual report
47	Neste Oil	B-2-B	Subjective Judgment
48	Nokia	Consumer	Subjective Judgment
49	Nokian Renkaat	B-2-B	Annual report
50	Nordic Aluminium	B-2-B	Annual report

51	Norvestia	B-2-B	Annual report
52	Nurminen Logistics	B-2-B	Annual report
53	Okmetic	B-2-B	Annual report
54	Olvi	B-2-B	Annual report
55	Oral Hammaslääkärit	Consumer	Annual report
56	Oriola-Kd	Consumer	Annual report
57	Orion	B-2-B	Homepage
58	Outokumpu	B-2-B	Annual report
59	Outotec	B-2-B	Annual report
60	Pkc Group	B-2-B	Annual report
61	Pohjola Pankki	Consumer	Subjective Judgment
62	Ponsse	B-2-B	Annual report
63	Qpr Software	B-2-B	Annual report
64	Raisio	B-2-B	Annual report
65	Ramirent	B-2-B	Homepage
66	Rapala Vmc	B-2-B	Annual report
67	Raute	B-2-B	Annual report
68	Rocla	B-2-B	Annual report
69	Saga Furs Oyj	B-2-B	Annual report
70	Salcomp	B-2-B	Annual report
71	Sampo	Consumer	Subjective Judgment
72	Sanomawsoy	B-2-B	Subjective Judgment
73	Scanfil	B-2-B	Annual report
74	Soprano	B-2-B	Annual report
75	Srv Group	B-2-B	Annual report
76	Stockmann	Consumer	Annual report
77	Stonesoft	B-2-B	Annual report
78	Stromsdal	B-2-B	Annual report
79	Suomen Terveystalo	Consumer	Subjective Judgment
80	Suominen	B-2-B	Annual report
81	Talentum	Consumer	Annual report
82	Tamfelt	B-2-B	Annual report
83	Technopolis	B-2-B	Annual report
84	Tecnotree	B-2-B	Annual report
85	Tectia OYJ	B-2-B	Annual report
86	Tekla	B-2-B	Annual report
87	Teleste	B-2-B	Annual report
88	Tieto	B-2-B	Annual report
89	Tiimari	Consumer	Annual report
90	Trainers' House	B-2-B	Annual report
91	Tulikivi	Consumer	Annual report
92	Turvatiimi	B-2-B	Annual report
93	Upm-Kymmene	B-2-B	Annual report
94	Uponor	B-2-B	Annual report
95	Vacon	B-2-B	Annual report
96	Vaisala	B-2-B	Annual report
97	Wärtsilä	B-2-B	Annual report
98	Wulff-Group	B-2-B	Annual report
99	Yit	B-2-B	Annual report
100	Yleiselektroniikka	B-2-B	Annual report